

*Natural Resource*

**ENTERPRISES**



## FOREWORD

This informational binder is designed to assist landowners in developing natural resource enterprises on their properties. Such enterprises include fee access hunting and angling, wildlife watching, horse trail riding, agritourism, and bed and breakfast businesses. These enterprises can be integrated successfully with agriculture and forestry. If you are interested in obtaining information on a subject that is not represented here, please contact us and we will be delighted to assist you. We hope you find this information useful and look forward to assisting you in starting your natural resource enterprise.





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# AGRITOURISM



# ENTERTAINMENT FARMING AND AGRI-TOURISM

## BUSINESS MANAGEMENT GUIDE

**Abstract:** *Agri-entertainment and -tourism – new, highly consumer-focused types of agriculture – may offer additional options for diversification and adding stability to farm incomes. Farmers have invented a wide variety of “entertainment farming” options.*

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*El Rancho Nido de las Golondrinas, Lemitar, NM  
 Living History Farm Herb Garden  
 Photo by K. Adam*

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*Diversification into ... such opportunities as agricultural or educational tours, u-pick operations, farm stores, pumpkin patches, agricultural festivals, and farm stands is not a substitute for a pro family farm agenda.... [However,] one of my fears is that if farmers and ranchers are too tardy in their response to this emerging opportunity, theme park operators will develop simulated farms and operate them as agri-tourism attractions.*

– Desmond Jolly, Director  
 Small Farm Program  
 University of California – Davis

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# Introduction

Joel Salatin, innovator in small-scale agriculture and proprietor of Polyface Farm in Virginia, has published a handbook for beginning farmers. (1) In it he offers a perspective on an important dimension of the future of American farming – education and entertainment. At least one state – Vermont – has re-directed the bulk of its support for agriculture into rural tourism. Salatin and other agricultural writers believe that this is what the public wants and will pay for.

While the popularity of specific enterprises – such as pumpkin patches or U-Pick orchards – may ebb and flow, the public’s desire for a “farm experience” remains. Small diversified farms are ideally suited to agri-entertainment. Unlike the mega-hog facility or a corn/soybean operation producing bulk commodities, the small farm can recreate an earlier, simpler, human-scale vision of farming. The chief qualification for the rural landowner who expects to make a living from the land through agri-tourism is the desire and the ability to cater to tourists and meet their expectations of a farm visit.

Tourism is an important industry in many states. For example, it is the second largest industry in New York and the largest in Arkansas. Most writers agree on three main components of rural tourism: small businesses, agricultural events, and regional promotion. Some state agri-tourism promoters lump direct-marketing methods such as CSAs, as well as farm sales of such specialty crops as flowers, garlic, and Asian pears, within the general category of agri-tourism. State-led agri-tourism initiatives work to expand existing businesses, create new festivals and farm markets, and tie this all together regionally to attract visitors. Federal, state, and corporate grants funded the 500-mile Seaway Trail along Lake Ontario in New York, providing advertising and promotion of its agri-tourism enterprises along the way.

There are three agri-tourism basics: Have something for visitors to see, something for them to do, and something for them to buy. How well you relate the various components (through a theme or otherwise) will determine how successful your entertainment enterprise will be. Things to see and do are often offered free, but there is still a lot

of money to be made selling to visitors. Research shows that tourists buy mainly food, beverages, and souvenirs.(2)

## Advice for New Ag Entrepreneurs

Starting any new enterprise can be risky. Before investing money, time, and energy in an unconventional agricultural business, new entrepreneurs should complete personal, market, project feasibility, and financial evaluations. Workbooks are available to help work through the questions that arise in enterprise planning. Technical and managerial assistance in these evaluations is available from a wide variety of sources. These include county Extension educators, local and regional organizations committed to rural economic development, small business development centers, state departments of agriculture, economic development agencies, banks, tourism agencies, state universities, and local community colleges. For a brief agri-tourism development checklist, see Appendix A. A business plan can then be developed (basically a spreadsheet) to evaluate the enterprise financially. For guidelines, see the 2004 ATTRA publication *Agricultural Business Planning Templates and Resources*.

## Things to See

### ***Educational tours***

In 1993, 14 farmers in largely agricultural Dutchess County, New York, cooperated in creating an educational tour using “crop art” as the focal point. Their aim was to publicize the plight of the family farmer and create a positive image of agriculture for the next generation of urban voters and consumers. The art consisted of large sculptures made from hay bales and other farm crops. (Different types of crop art will be discussed in more detail below.) One of the tour’s sponsors, Farm Again, is an organization that matches beginning farmers with retiring farmers to ensure that land is kept in family-sized agricultural production. Others involved in sponsoring the

project included Cornell Cooperative Extension, the local Farm Bureau, and the Dutchess County tourism agency.

At the same time, Farm Again sponsored a farm tour project for school children as part of its aim to “re-invent agriculture” in a farming community on the edge of suburban sprawl.(3) This type of tour is part of an overall regional public education strategy, exemplifying comprehensive organization and far-reaching goals. At the other end of the scale, the Wachlin farm (“Grandma’s Place”), Sherwood, Oregon, provides a package deal for its specialty – school tours. They charge \$4 per child, and the children get any size pumpkin they can carry from the field, food for animals in the petting zoo, and a 20-minute talk on farming.(4)

While having several tour farms in close proximity is always desirable, most farmers interested in agri-tourism develop individualistic farm attractions. Many herb farms open to the public include a tour of the different herbs they are growing, and may include “nature walks” to show wild plants in their native habitat – riverbank vegetation, scarce examples of native prairie, rock outcroppings, or natural woods. (Former pasture land or plowed ground let go to weeds is not recommended for a nature walk.) For a profile of an herb farm that offers tours, see the ATTRA publication *Lavender Production, Products, Markets, and Entertainment Farms*.

Archeological sites are usually too fragile to become the focus of regular tours by the public. However, many farms have done well with recreations of former eras.

## **Historical re-creations**

Creating an agri-tourism attraction on your farm can be a lot of work and must be a labor of love. Some attractions grow out of the owners’ hobby collections – old farm machinery, log buildings, heirloom seeds, old bird houses, even a narrow-gauge railroad. Most, however, are created new from the owner’s concept – especially one that appeals to children.

## **A unique Iowa “little village”**

A unique form of agri-entertainment is the “little village” run by Farn and Varlen Carlson of Stanhope, Iowa. The tiny community includes a school, general store, church, livery stable, and blacksmithy. Appropriate artifacts fill the buildings, which are one-half to two-thirds scale. The Carlsons hope to add a barber shop, telephone office, bandstand, and fire station. There is an admission charge for viewing all the buildings, and the Carlsons cater to bus tour groups. Groups can also arrange to have barbecues at the village. Special events scheduled during the year include a threshing bee, an ice cream social on Father’s Day, Apple Cider Days in August, and a Christmas Stroll, when the Village is decorated for the season.(5)

## **Processing demonstrations**

Wineries and microbreweries have long appealed to the public’s fascination with how foods and beverages are made. Other possibilities are water-powered grist milling, sorghum milling, apple butter making, cider pressing, maple sugaring, sheep shearing, wool processing – all activities with an old-timey flavor.

### **A rural theme park**

Smiling Hills Farm, Westport, Maine, converted from a dairy farm into an agri-tourism business in the 1980s. The farm now draws 100,000 people a year and employs 100. Attractions include ice cream and sandwich sales, a petting zoo, a retreat center specializing in one-day mini-retreats, and activities for the 700 school children per day that may visit. Kids can climb in, on, and over a wooden train, a fire truck, and a small barn with a loft and places for cute photo opportunities. They can dig sand with kid-powered backhoes and steam shovels. Children mingle with animals in the petting barn area. Ducks and rabbits have the run of their own doll-house-like “Duck House” and “Rabbit House.” Group activities include tours, birthday parties, summer farm programs, wagon and sleigh rides, Halloween and maple season events, and cross-country skiing and skating in the winter.

## **Crop art**

Invite a crop artist to turn one of your cornfields into a work of art. It will be the talk of the countryside and may attract national media attention (especially if an actor dressed in a pale blue wetsuit with antennae on his head runs around and periodically pops up at unexpected times near the artwork). The crop art displayed by the fourteen Dutchess County, New York, farmers attracted thousands of visitors, including 1,000 school children, a month. Additional people came to their summer on-farm educational programs intended to strengthen urban ties to agriculture. Many farms that encourage school tours aim to build goodwill and long-term customers, rather than charging for the tours.(6)

Crop art runs the gamut from the fanciful sculptures of Dutchess County to floral designs, from designs mowed in a field to Halloween pumpkin displays like those seen on the Rohrbach Farm near St. Louis. Most crop art—at least in the Midwest—consists of designs cut into standing grain crops in a field, or alternatively, designs created by different colored plantings. Such crop art is best viewed from the air or from a raised structure. There have also been proposals for creating mound-like structures with Native American designs outlined in edible native plants, and there are agricultural mazes—which provide something to do as well as see. There are a number of full-time professional crop artists advertising on the Worldwide Web, as well as maze designers and franchisers. (Mazes are discussed more fully below.)

Madera County, California, farmer Darren Schmall originated the “Pizza Farm” concept, a subspecies of crop art. One field is devoted to a circular arrangement of crops and animals. Pie-shaped wedges of pepper plants, wheat, tomatoes, and so on represent pizza ingredients. Several sections house hogs and cattle (representing sausage and cheese). This is reportedly one of the fastest-growing types of crop art. Children use a coin-operated feed pellet machine to feed the animals.

Visitors expect to pay admission to farm attractions—even to view (and photograph) crop art. Maze operators generally charge admission. Joel Salatin advises farmers to build a haybale observation deck with a view of the maze, so that grandparents can take photos. Sales of food, beverages, and photographic supplies can take place here. Charge for some things, and give something away free. “While no one is certain that providing some activities free of charge improves the net return to the farm, they undoubtedly increase the farmer’s gross receipts through increased customer traffic.”(7)

## **Natural features**

An outstanding natural feature on a farm may become a tourist attraction—a bluff or rock outcropping, a waterfall, a grove of persimmon trees, a stream, or a spectacular view. Water is a popular natural attraction; sometimes natural features of interest to a visitor may have been overlooked by the farmer.



## **Festivals/ pageants/ special events**

Special events can mean either private parties or public events. They range from offering food, drink, and overnight accommodations to sportsmen to birthday parties, weddings, company picnics, and Halloween festivals. To put on an annual festival or pageant open to the public may be beyond the scope of all but the largest farm entertainment businesses. Individual farms often participate in a countywide or regional festival, with significant government and organizational sponsorship. A few farms are now hosting 700 to 1,000 visitors per day for their unique offerings. Farms along the road to well-known annual festivals can find many ways to participate in opportunities created by the increased tourist traffic.

### **Children's Activities for a Harvest Festival**

- Vegetable Contest (from children's gardens)
- Vegetable Bingo (cards with names and/or pictures; veggie seed prize)
- Flower Smashing (using rubber mallets to flatten flowers between thick sheets of paper, making nice, flower-patterned cards)
- Vegetable Shape Mobiles (sticks and cutouts from old office paper)
- Ecopots (newspapers made into little pots for planting seeds)
- Chia Pets (paint faces on old footie stockings filled with soil and grass seed)
- Potato Prints (tried and true)
- Making Recycled Paper (need blender, water, flat strainers)
- Hair Wreaths (raffia, flowers, ribbon)
- Bookmarks (tried and true – wax paper, flowers, and an iron.)
- Root/Stem/Bud/Seed (kids have cards with words and must match to appropriate produce after brief lesson)
- Seed Sprouts in Baggies (soaked bean seeds, paper towels, baggies)
- Leaf Prints (leaves, crayons, paper)

*(from Karen Guz, Horticulture Associate, Bexar County, Arizona, listserve: communitygardening@ag.arizona.edu, 6/25/98)*

living for the developmentally disabled. Many small herb or vegetable farms offer classes in cooking, arranging flowers, or making herbal medicines. They depend on these activities to help build a clientele for their main products.

Farms have traditionally offered field days, sometimes sponsored by a farm organization. Many tours are also considered educational.

Some of the best examples of farm diversification involve education. Two of the most notable are The Land Institute (which has just received a grant to launch a 50-year research project on perennial grains) and Heritage Farm, home of the Seed Savers Exchange and Seed Saver publications.

Launching such an enterprise takes considerable connections, savvy, outside-the-box thinking, and dedication. It is a life's work dedicated to something beyond just farming, and is certainly not for everyone.

## **Things to Do**

### **Farm schools/workshops/ educational activities**

The educational activities offered on farms range from day classes or short-term workshops to full-scale, accredited courses of study. Farm schools accommodate interns or apprentices, and some charge tuition for the learning opportunity. There are also farm schools geared toward residential

Many of the farms listed in the on-line database of Sustainable Farming Internships and Apprenticeships, maintained by the National Center for Appropriate Technology ([www.attra.ncat.org](http://www.attra.ncat.org)), have elements of an educational or entertainment farm. Several plantations on the Potomac River, including Mt. Vernon, have been turned into educational farms. The workers on Mt. Vernon grow 18th-Century crops and gardens, use 18th-Century tools, and dress in period costumes.

## **Accommodations for outdoor sports enthusiasts**

Some farms adjacent to recreational areas build a business catering to the needs of visitors to those areas. A farmer in Missouri opened a lunch counter for the convenience of parents bringing children to a nearby summer camp. Farmers in the Adirondacks regularly accommodate skiers and hikers with shade, food, and drink, sometimes extending to overnight accommodations. A 1500-acre wheat farm on the Great Plains became a pheasant hunting ranch in the off-season, with a lodge and a gift shop (more about fee hunting below).

## **Petting zoos/children's amusements/playgrounds/horseback riding/hayrides**

Old McDonald's Children's Village, Sacket's Harbor, is the largest petting farm in New York. Near Watertown, on the Seaway Trail, the Children's Village was started as a way to increase cash flow to expand a market hog and feeder pig business. Ponies, rabbits, ducks, lambs, baby goats, calves, and piglets are sure-fire attractions for city children (and their parents). Pony and wagon rides are part of the mix. Playgrounds and hayrides also provide something for children to do at Pick-Your-Own farms.

Balky Farms in Northfield, Massachusetts, invites school classes to visit during lambing season in March and April. Baby crias, pygmy goats, and bunnies are also winners. Cheviot, Dorset, and Navajo Churro sheep, geese, peacocks, emus, oxen, Black Angus cattle, relief heifers, miniature horses, and donkeys succeed with the more venturesome. Tendercrop Farm in Newbury offers "buffalo viewing," while Valley View in Charlemont hosts llama-picnic treks. More information on animal entertainment can be found in the 2004 NRCS publication *Success Stories – Agritourism, Direct Marketing, Education, Conservation, Agritainment*. (Call 1-888-LANDSCAPE or see [www.nhq.nrcs.usda.gov/RESS/econ/ressd.htm](http://www.nhq.nrcs.usda.gov/RESS/econ/ressd.htm).)

## **Pick-Your-Own (U-Pick)**

In the 1970s U-pick farms were at their height of popularity. Families with three or four hungry teenagers and full-time homemakers were still common. Canning a couple of bushels of green beans or putting a flat of strawberries in the freezer helped out the family budget significantly. Raw materials were harder to come by than labor, compared with today. Canning has been all but eliminated today as a home activity because it represents a lost opportunity for the housewife to be gainfully employed, instead of receiving nothing for her hard work (i.e., the opportunity cost of labor) putting up the winter food supply. Small batches of gourmet recipes may be stored in the family freezer, but more than 50% of U.S. meals are now commercially prepared and eaten away from home. While U-pick operations can still be found, successful ones are most likely to be part of the whole entertainment-farm enterprise mix.

U-pick offers several advantages to farmers. They are relieved of the burden of finding and paying temporary seasonal labor at harvest time. This type of labor is becoming harder and harder to find. The hours are long and hot; the work, back-breaking. If people can be persuaded to pick as entertainment and get a few cents off per unit, the farmer is way ahead. However, sustainable farmer Kelly Klobner has observed, "The whole premise of 'here we are/come out and get dirty picking our crops/then pay us handsomely for the privilege' is a hard sell" (8) in today's world and may depend on how attractively the experience can be packaged and how aggressively it is marketed. Above all, the average farmer's natural distaste for selling must be overcome and he must learn to think like a customer. This means, at a minimum, creating adequate parking, having restrooms, having a safe entertainment area for small children, and working with an insurer on liability issues. Small children are best kept away from the picking area, as they contribute disproportionately to damaged crops and "inventory shrinkage." Attention to these basics will help build repeat sales, a primary goal of all direct marketing.

### Related ATTRA Publications

- *Direct Marketing*
- *Lavender Production, Products, Markets, and Entertainment Farms*
- *Reap New Profits: Marketing Strategies for Farmers and Ranchers (with SAN)*
- *Agricultural Business Planning Templates and Resources*

U-pick operations do best when they are located within an hour's drive of a population center of at least 50,000 people. This stipulation leaves out much of the Midwest, mountain states, eastern Kentucky, and parts of the Deep South. U-pick is about selling to families who do not have the space to grow their own seasonal vegetables in quantities sufficient for canning and freezing. The mix of vegetables and fruits will depend on customers' tastes (constantly becoming more sophisticated), rather than on what can most easily be grown. Like other forms of entertainment farming, U-Pick will be adversely affected by any dramatic rise in the price of gasoline.

### **Themes for entertainment farming**

Most entertainment farming depends in large part on attracting visitors from urban centers. Your neighbors in all likelihood won't be your customers. Something about your farm must be so distinctive that it draws people from long distances—even Canada or Europe. Perhaps you could invite a Native American group to hold regular pow-wows on your land; you operate the food concession and give tours of your farm dressed in a pioneer costume. Hold a summer festival. Add a historical garden to increase the draw. Add a gift shop, an antique shop, a lunch counter, crafts, botanical products. Add a herd of buffalo. People will come from Europe to see a herd of buffalo or prehistoric White Park cattle when they won't cross the road to see your prized Black Angus. Have a widely publicized farm festival—harvest festivals with music and plenty of good food and drink, and maybe face painting and personalized cupcakes. In the fall, public schools emphasize the American fall holidays,

in which the pumpkin plays a significant role. Pumpkins are easy to grow, readily available, large, and colorful. Invite busloads of school children to visit your farm.

Following the disastrous Missouri/Mississippi River flood in 1993, the Rohrbach Farm, 50 miles from St. Louis, turned a significant portion of corn/soybean acreage into an entertainment farm featuring pumpkins. One field became a parking lot, with ample room for tour buses. When visitors come (by busloads) to view the large, attractive, free crop-art displays constructed by the Rohrbach clan, few leave without buying a pumpkin or something from the farm store.

The pumpkins are, of course, not pumpkins of eating quality. Those pumpkins remaining after the season is over are taken out into the woods to compost. One lesson the modern farmer learns, according to Joel Salatin, is that you have to accept a certain amount of waste and have to give something away free at times. (For a more complete account of activities at the Rohrbach Farm, see the ATTRA publication *Direct Marketing* and the Winter 1999 issue of USDA's *Small Farm News*).

### **Mazes**

Mazes are another option. In 1993 Don Frantz (a former Disney producer) created a 3.3-acre dinosaur maze in a Pennsylvania cornfield, and later created the American Maze Company, now producing increasingly elaborate mazes around the country and advertising on the Internet. The success of this farm entertainment venture has inspired a number of competitors throughout the American Cornbelt. Frantz says, "We try to keep them entertained for about two hours (about the length of a movie), and charge them about what they'd pay for a movie." He recommends good crowd control, ample restroom facilities, refreshments, and other farm products to sell. Most important is an integrated marketing plan, which the top maze designers now all sell as part of their design packages.

The Jamberry Farm, Madill, Oklahoma, features a 3-acre maze, funded in part by a grant from the Kerr Center in Poteau, Oklahoma. Visitors pay \$5 to walk through the maze and the farm's 5-acre



©2004Clipart.com

### Maze puts Colorado farmer in the black

A cornfield “Bronco” maze has put the Glen Fritzler 350-acre vegetable farm in the black for the first time in 10 years. Busloads of school-children and tourists pay \$6 each to walk through the maze, created by Utah designer Brett Herbst’s patented process. By the fall of 2000 Herbst had done 61 mazes. The Bronco is, of course, the mascot of Denver’s professional football team.

Herbst gets a fee for the design and a percentage of the gate. The Fritzler family mans the ticket booth and sells t-shirts, often until 10 p.m. on weekends. Fritzler is thankful to have found a good way out of the agriculture boom-bust cycle by offering to entertain the public and create a new stream of steady income. For more information on Fritzler’s maze, call 970-737-2129.

*From the listserve Market Farming, Sept. 12, 2000. Market-farming@franklin.oit.unc.edu.*

pumpkin patch (or ride a hay wagon). The farm also features a picnic area, a playground, and pumpkin sales. Personnel from the nearby Noble Foundation assisted in setting up the maze.

#### Joel Salatin’s List of Farm Activities

- ✎ Petting zoo
- ✎ Straw bale maze
- ✎ Baked treats
- ✎ Arts and crafts
- ✎ Hay rides
- ✎ Haunted house
- ✎ Homemade toys
- ✎ Miniature golf
- ✎ Full food service
- ✎ Observation deck
- ✎ Company parties
- ✎ Catering
- ✎ Pumpkin patch
- ✎ Face painting
- ✎ Concessions
- ✎ Bonfire with marshmallows

See **Appendix B** for more ideas about entertainment farming enterprises.

## Things To Buy

The bottom line for most entertainment farms is how much you can sell – either now or later – to the people attracted to your farm. Surprisingly, many farmers feel that even farmers’ markets are primarily useful in building a steady customer base, not in daily sales. These potential customers will get to know you and later seek you out to meet their unique needs. This is the principle of “relationship marketing.” Sell to people who come to know you and count you as a friend. Your farm store or gift shop should display your farm’s finest products to maximum advantage to build repeat sales.

### **Food and drink**

Outdoor activities on a warm day will make anyone thirsty. Ready-to-eat food and a selection of beverages are part of the experience of your entertainment farm. They can also be a profit center. Be as creative as you can, and try to have refreshments that fit your farm’s theme.

If you operate a winery, you will naturally have your products displayed. Think of opportunities for selling cold beverages to the grandparents photographing the maze, the u-pickers, the children who have just done 100 turns on the slide out on the miniature hay-mow. On a recent visit to an herb farm, I was offered the opportunity to buy a commercially bottled nutraceutical drink – containing St.

Johnswort, valerian, and guarana. Apple cider is a good drink for the Midwest, and people may want to buy a gallon to take home.

Homemade ice cream, sandwiches, fresh fruit, barbecue, and roasting ears are all possibilities for ready-to-eat food sales.

## **Gifts and souvenirs**

There is a huge industry overseas manufacturing regional souvenirs for the U.S. If at all possible, have your gift items represent your farm, something that is actually produced locally. Stick to a theme, something that truly represents the uniqueness of your farm and your region. Items for sale on an herb entertainment farm can include everything from potted rosemary plants to a complete set of essential oils for aromatherapy. Wood carvings (traditionally done in the slow winter months), dolls, quilts, basketry, wheat weavings, pottery, packets of heirloom seeds, and decorative items such as fresh and dried flowers, pumpkins, corn shocks, and handloomed wool – as well as foods, such as meats, cheeses, other milk products, and winter squash – are all possibilities. One farmer realized that decorative shocks were worth more than his corn. Another sold echinacea flowers when the bottom dropped out of the market for echinacea root. Research by the North Central Region Extension Service revealed that wood is the medium preferred by tourists for crafts. This research also determined that women probably don't charge enough for the craft items they market, since men typically charge two to four times as much.

You will need an approved commercial kitchen for any value-added food products produced on the farm. This type of facility can cost \$100,000

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**Farmers who have become successful in value-added enterprises typically find retail profits so attractive that they begin to purchase, rather than grow, much of their raw material. The farm then takes on the character of a land-based business enterprise, not just a producer of commodities.**

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or more – if, typically, you must build a separate building from the ground up. You will need access to an approved slaughterhouse for any meat products. (For more information, see Joel Salatin's book.) Alternatives include a cooperative community kitchen or renting a commercial kitchen. Cornell University is even developing a mobile commercial kitchen. Be familiar with

your state's processing regulations if you are planning to sell on-farm processed food to the public. State health departments or departments of agriculture, universities, and business incubators can assist.

## **Shopping at the farm store**

Maureen Rogers of The Herbal Connection provides this advice (originally from *Bottom Line/Business*, 1/97).

The key to successful retailing for [the next few years] will be to make shopping not merely pleasant but entertaining as well. Despite the growth of catalog shopping, consumers will continue to go to stores. But the stores they visit will be the ones where they not only find what they like at the right price, but where they can have a good time. Bookstores with coffee bars are a good example.

A 1992 study of tourists' shopping habits, conducted by the North Central Regional Extension Services, determined that "after meals and lodging, [tourists] spend most of their tourist dollars on clothing, crafts, and local food products. Almost 70 percent buy gifts for future events and for mementos" (*Small Farm News*, September-October, 1993, p. 3). Consider installing a convenient automatic teller machine (ATM).<sup>(9)</sup>

Farmers must be prepared to sell themselves as well as their businesses, so image is all-important. People want to see an attractive facility and personnel – neat and clean. Location and appearance are the most important aspects of a farm business that caters to the public – not necessarily price.



Remember that return customers are the key to success. Eighty percent of your business comes from 20% of your customers, and it takes five times as much money/time/effort to get a new customer as it does to keep an old one.

## **A Maine farm store**

In the mid-1980s Gregg and Gloria Varney bought his parents' Maine farm after they sold their dairy herd. The farm included excellent crop land. The Varneys' first farm business was Gloria's yarn shop, which started people coming to their farm. This became the impetus for the Varneys to expand their offerings at the farm store to include their own meats (beef, veal, lamb, pork, chicken, and turkey), raw milk, and baked goods. In 1994, with the help of apprentices, Gloria and Gregg implemented a five-year plan to "learn how to make cheese and raise small scale animals with minimal grain purchases." After initially hitting a wall when they realized they needed a state-inspected cheese facility and pasteurizer that could cost \$10,000, they arranged to borrow the money from future customers, paying off the loans with food from the store. For example, a \$100 loan could be redeemed at a later time for \$110 worth of farm-raised food.

The goat-cheese operation has been a huge success, and it allows an April to November schedule that fits in well with their farmers' market schedule and the Thanksgiving season, giving them a break from the end of November for the next six months. In 1995 the Varneys became 100% organic with the conversion of the dairy cow operation. They now have more than 100 organic cows.

Their product line in the farm store has expanded, as well. Surplus vegetables go into value-added products such as pickles, relishes, and stewed tomatoes. Other excess is used to feed the pigs and chickens. This integrated operation is a big hit with customers, who now have no question about where their food originates. People now come to the farm not just to buy their food but to spend time there and let their children see the animals.(10)

The Varney Farm is not the only farm in Maine oriented toward tourism, and there are regularly

scheduled regional farm tours. Tickets to farm daytrip tours in Maine, generally including two or three farms in a single county, cost \$12 to \$15 per person, with children under 12 free. Lunch is extra.

### **Highlight a garden path**

Appleton Creamery is a small-scale goat farm and dairy where Brad and Caitlin Hunter also grow flowers and organic vegetables, including many heirloom varieties. Brad, a home brewer and wine maker, has included in the garden two essential ingredients for beer and wine – hops and grapes. A collection of bird houses surrounds the traditional cottage garden, where the Hunters grow edible flowers and herbs to use in the farm's goat cheeses, and a path through the garden leads to the barn, where visitors can see the goats.

The grounds also house "garden sculpture" created out of found objects – old farm equipment, flea market furniture, cast-off children's toys.

## **Nature-based tourism**

A further option for recreational farming is leasing wooded land or marginal cropland for hunting, fishing, or hiking. Hunting leases are the most common form of recreation leases and can range from one-day trespass fees to guided trips and lodging. Of course liability, licenses, and regulations are important considerations in planning for a recreational lease.(11) Such use can sometimes be combined with overnight lodging, campgrounds, and a farm store. Texas A&M University, <http://survey.tamu.edu/ntactivities>, has a program at its La Copita Ranch to train land managers in hosting this type of tourism.

For information and technical advice on licenses and regulations, contact local offices of the following agencies.

- Fish and Wildlife Service
- USDA Natural Resources Conservation Service
- State Department of Natural Resources

Another source of information on hunting leases is *Managing Your Farm for Lease Hunting and a Guide to Developing Hunting Leases*.(12)

## **e-Commerce**

With a click of the mouse a worldwide audience can gain access to your information. More and more sites featuring particular farms and selling farm products directly to consumers are joining the organization-sponsored producer directories now on-line. Some farm Web sites are listed in ATTRA's *Direct Marketing* publication.

## **Liability**

Liability issues for farms that host the public are generally resolved with appropriate insurance. Insurance needs will vary by operation. Neil Hamilton's book *The Legal Guide for Direct Farm Marketing* provides guidance on choosing and consulting with an independent insurance agent (see **Resources**, below). Insurance representatives can provide guidance on specific steps for reducing risks of your operation. A new database on farm injuries can be found at [www.nsc.org/necas/](http://www.nsc.org/necas/).

Specific examples of how individual farms have handled insurance needs may be found in the NRCS publication *Success Stories – Agritourism, Direct Marketing, Education, Conservation, Agritainment*. (Call 1-888-LANDSCAPE or see [www.nhq.nrcs.usda.gov/RESS/econ/ressd.htm](http://www.nhq.nrcs.usda.gov/RESS/econ/ressd.htm).)

## **Complying with the Americans With Disabilities Act (ADA)**

Modifications to allow the differently abled access to your farm attraction include the following.

- space reserved for handicapped parking
- a farmstand with a hard packed or paved surface
- one bathroom accessible to the handicapped (can be rented)

- a ramp to a platform that's slightly higher than the hay wagon (for handicapped access to hayrides)
- a "long reacher" for apple picking
- raised beds for strawberry picking
- for seasonal events, a sign saying, "If you need assistance...."
- large-print signs, brochures, or audiotapes of brochures.
- door openings at least 32 inches wide (to accommodate wheelchairs) and doors able to be opened with a closed fist (knobs are out).
- rugs taped to the floor with velcro.

### **Guarding against risks to children on the farm**

#### Age 0-5

Careful supervision by adults. Physical barriers such as locks and fences. Safe distractions. No riding on farm machinery.

#### Age 5-10

Consistent rules; discussing safe behavior; careful supervision of activities.

#### Age 10-16

Consistent rules, with consequences for infractions and rewards for safe behavior.

#### Age 16-18

Prohibition of drugs and alcohol. Emphasis on acceptance of adult responsibilities. Opportunity to be role models for younger children.

An Americans with Disabilities Act (ADA) representative will usually be glad to come out and advise you on specifics.

Risks incurred when the public is invited to a farm may include soil compaction, damage to orchards and crops, litter, and of course increased liability. Such costs have been estimated at \$1 to \$2 per visitor, which should be factored into fees and prices.

## Conclusion: The New Outlook

Professor Duncan Hilchey of the Cornell Sustainable Agriculture program advises American farmers:

Growers have to adopt a new outlook and switch their thinking away from production toward giving today's consumers what they want. That might include farm tours, value-added products, or even adding a petting zoo. People come out to the farm these days not so much to buy large quantities of produce, but for the immersion experience for themselves and their children. They are looking for a farm-fresh feeling—not just food.(6)

The University of California's Small Farm Center has developed an on-line agricultural tourism directory ([www.calagtour.org](http://www.calagtour.org)) to provide tourists with an easy way to "search for a farm experience." Farm proprietors interested in a listing are encouraged to contact the Center.(13) A national agri-tourism database ([www.farmstop.com](http://www.farmstop.com)) complements those developed by Illinois, Texas, and other states.

The number-one requirement for a successful agri-entertainment venture is an abundance of energy and enthusiasm. A willingness to think unconventionally may be equally important. Whatever you do, do it with a flair for showmanship. Let your creative side come out. With enough thought, ingenuity, determination, and capital, almost any farm anywhere could be adapted to agri-entertainment. Stiff-necked individualism and suspicion of change work against success in entertainment farming. A willingness to provide what the public truly wants and is willing to pay for is the way to success. Just as the railroad barons of the 19th century needed to start thinking of themselves as being in the transportation business (instead of the railroad business) in order to compete successfully in the 20th; so the farmers of the 21st century must begin thinking of themselves as being in the land management business, rather than the farming business, in order to reach their farm family goals and dreams.

### Databases

- **National:** [www.farmstop.com](http://www.farmstop.com)
- **California:** [www.calagtour.org](http://www.calagtour.org)
- **Texas Nature Tourism Database and Workbook:** <http://survey.tamu.edu/ntactivities>
- **Illinois:** [www.leisurestudies.uiuc.edu/agritourism](http://www.leisurestudies.uiuc.edu/agritourism)

## References

- 1) Salatin, Joel. 1998. You Can Farm: The Entrepreneur's Guide to Start and Succeed in a Farming Enterprise. Polyface Inc., Swope, VA. 480 p.
- 2) Klonsky, Karen et al. 1993. Marketing crafts and tourist products. Small Farm News. September-October. p. 3. [article based on a survey of 1,400 farm crafts marketers by North Central Regional Extension Service, University of Nebraska]
- 3) Buck, Cathy. 1995. Ag tourism opens opportunities; Crop art is more than pretty pictures. American Agriculturist. September. p. 7.
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- 8) Klober, Kelly. 2000. U-Pick Marketing. Small Farm Today. May. p. 41-42.

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- 10) Adapted from Maine Organic Farmer & Gardener (MOFGA) News. June-August 2000. p. 27.
- 11) Elias, Debra. 1996. Recreational Leases. Minnesota CRP Information Series. December. 2 p.
- 12) Delaware Cooperative Extension Service. 1988. Managing Your Farm for Lease Hunting and a Guide to Developing Hunting Leases. No. 147. DCES, Georgetown, DE.
- 13) Small Farm Center  
University of California  
One Shields Ave.  
Davis, CA 95616-8699  
530-752-8136  
530-752-7716 FAX  
sfcenter@ucdavis.edu

## Resources

### **Comprehensive**

USDA/NRCS. 2004. *Alternative Enterprises and Agritourism, Farming for Profit and Sustainability – Tool Kit*. 2300 p. Available at [www.nrcs.usda.gov/technical/RESS/altenterprise/resmanual.html](http://www.nrcs.usda.gov/technical/RESS/altenterprise/resmanual.html).

### **Agricultural tourism business development**

Agri-Business Council of Oregon. 2003. *Agri-Tourism Workbook*. 110 p. [www.aglink.org](http://www.aglink.org).

Cornell University Materials

- Agritourism (Resource Packet)
- Agritourism in New York: Opportunities and Challenges in Farm-Based Recreation and Hospitality (Publication)

- Considerations for Agritourism Development (Publication)
- Farming Alternatives: A Guide to Evaluating the Feasibility of New Farm-Based Enterprises (Publication)

*May be ordered from:*

*Educational Resources Program:*  
607-255-9252

*Media Services:* 607-255-2080

*Community Food and Agriculture Program:* 607-255-9832 or 255-4413

*Farm and Ranch Recreation Handbook.*  
[uwadmnweb.uwyo.edu/RanchRecr](http://uwadmnweb.uwyo.edu/RanchRecr)

Hamilton, Neil. 1999. *The Legal Guide for Direct Farm Marketing*. Drake University Press, Cedar Rapids, IA. 235 p.

New Mexico Department of Tourism. 2000. "Ag" Tourism.  
[www.nmsu.edu/~redtt/Resources/html/AgTours.html](http://www.nmsu.edu/~redtt/Resources/html/AgTours.html)

University of Minnesota. 2003. *Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses*. Minnesota Institute for Sustainable Agriculture, St. Paul, MN.

\$14.00 plus 3.95 s/h; 411 Borlaug Hall, St. Paul, MN 55108; 1-800-909-MISA.  
Misamail@umn.edu  
Make checks payable to University of Minnesota.

USDA/AMS. 2000. *Direct Marketing Today: Challenges and Opportunities*. 58 p. [www.ams.usda.gov/directmarketing/DirectMar2.pdf](http://www.ams.usda.gov/directmarketing/DirectMar2.pdf).

Order publication from: [velma.lakins@usda.gov](mailto:velma.lakins@usda.gov).

### **Articles of general interest**

Adam, Katherine. 2002. Agritourism: Profit from your lifestyle. *Mother Earth News*. June-July. p. 18.

Jolly, Desmond. 1999. Agricultural tourism: Emerging opportunity. *Small Farm News*. Summer. p. 1, 4-5.

Jolly, Desmond, and Jeanne McCormack. 1999. Agri-tourism: A desperate last straw? *Small Farm News*. Fall. p. 2.

Lyson, Thomas. 2000. Some thoughts on civic agriculture. *Farming Alternatives* [Cornell]. p. 1, 4.

*A substantial number of smaller-scale, locally oriented, flexibly organized farms and food producers are taking root [to] fill the geographic and economic spaces passed over or ignored by large ... producers. These farms will articulate with consumer demand for locally produced and processed food. Civic agriculture is not only a source of family income for the farmer, but contributes to the social, economic, political and cultural health and vitality of the communities in which they exist.*

McCue, Susan. 1999. Successful agricultural tourism ventures. *Small Farm News*. Summer. p. 1, 6-7.

SAN. 2000. Marketing Strategies: Farmers and Ranchers Reap New Profits. *Small Farm Today*. May. p. 35-38.

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**By Katherine L. Adam**  
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HTML  
<http://www.attra.ncat.org/attra-pub/entertainment.html>  
PDF  
<http://www.attra.ncat.org/attra-pub/PDF/entertn.pdf>

## Appendix A

### Checklist of Agri-tourism Development Considerations\*

#### Agri-tourism businesses

- Personal evaluation
- Market evaluation
- Project feasibility evaluation
- Financial evaluation
- Business plan development
- Marketing plan development
- Insurance needs
- Regulations and permits

#### Farm festivals

- Planning committee
- Festival mission
- Location of festival
- Licenses and permits
- Attractions, entertainment, food
- Budget strategy
- Promotional campaign
- Insurance needs
- Management considerations
- Public safety plan
- Evaluation

#### Farmers' markets

- Market coordinator
- Planning meetings
- Advisory committee
- Organizational structure
- Visitor market groups
- Location of market
- Vendor fees
- Promotional campaign
- Insurance needs
- Appearance of market
- Customer amenities
- Vendor support and policies
- Coupon programs
- Evaluation

#### Regional agri-tourism planning

- Region identification
- Community involvement
- Concerns about development
- Visitor market groups
- Planning sessions
- Goals and objectives
- Resource and attraction inventory
- Theme
- Action plan
- Promotional plan
- Evaluation

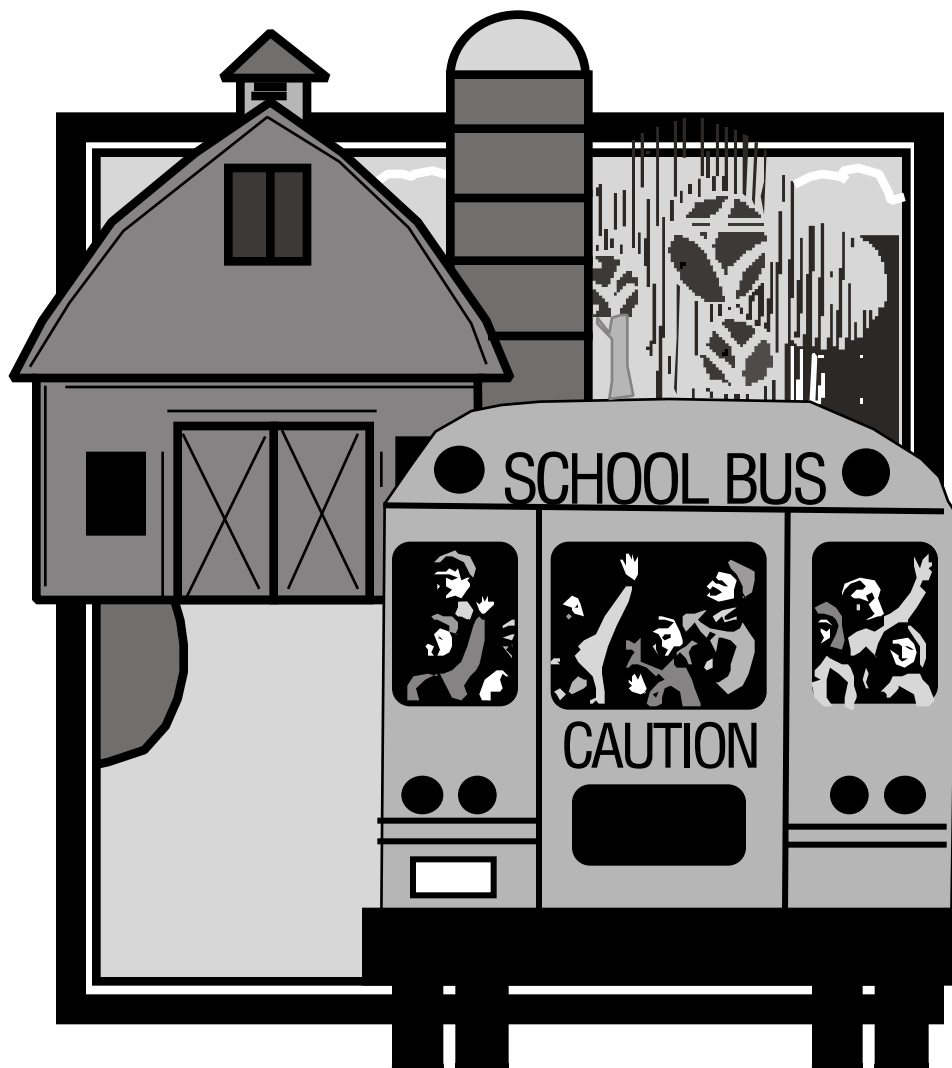
\* from: Kuehn, Diane et al. 1998. *Considerations for Agri-tourism Development*. p. 1.

**Appendix B: Some Successful Entertainment Farming Enterprises and Techniques (farm recreation and hospitality businesses)**

Wineries with Friday happy hours	Educational tours	Historical re-creations
Arts & crafts demonstrations	Farm schools	Living history farms
Farm stores	K-12 schools	Heirloom plants and animals
Roadside stands	Outdoor Schools	Civil War plantations
Processing demonstrations	Challenge Schools	Log buildings
Cider pressing	Movement-based retreat centers	Maple sugaring
Antique villages	Native American villages	Sheep shearing
Herb walks	Frontier villages	Wool processing
Workshops	Collections of old farm machinery	Sorghum milling
Festivals	Miniature villages	Apple butter making
Cooking demos	Farm theme playgrounds for children	Fee fishing/hunting
Pick-your-own	Fantasylands	Farm vacations
Pumpkin patches	Gift shops	Bed and breakfasts
Rent-an-apple tree	Antiques	Farm tours
Moonlight activities	Crafts	Horseback riding
Pageants	Crafts demonstrations	Crosscountry skiing
Speakers	Food sales	Camping
Regional themes	Lunch counters	Hayrides
Mazes	Cold drinks	Sleigh rides
Crop art	Restaurants	Rest areas for snowmobilers or cross-country skiers
Pancake breakfasts during sugaring season	Pizza farms	Themes (apple town, etc.)
Bad weather accommodations	Native prairies preservation	Picnic grounds
Tastings	August "Dog Days" – 50% off dogwoods if customer brings picture of family dog, etc.	Shady spots for travelers to rest
Buffalo	Campgrounds	Hieroglyphics, rock art
Dude ranches	Indian mounds, earthworks art	Hunting lodges

# Targeting School Groups for Agritainment Enterprises:

## Summary of a Schoolteacher Survey in Tennessee





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## Foreword

A significant number of value-added projects evaluated and analyzed by the *Agricultural Development Center* (ADC) have been agritainment enterprises. Critical to the overall success of these enterprises has been a reliance on a significant amount of sales to groups — particularly school groups. In many cases, agritainment enterprises must rely on hosting groups during the week to break-even on their fixed and operating costs. Also, most agritainment enterprises do not have the luxury of being “build it and they will come” successes overnight. Rather, a significant amount of planning, marketing and promotion is required to develop short-term and long-term successful enterprises.

To effectively and efficiently plan agritainment enterprises that target elementary school groups, a survey of elementary schoolteachers was conducted by the ADC in 1999. The survey was developed, administered, evaluated and summarized under the leadership of the ADC’s marketing specialist, Dr. Kent Wolfe. Results of the survey have been the source of numerous presentations, fact sheets and project reports. However, prior to their use in an official publication, Dr. Wolfe accepted a position outside of The University of Tennessee Institute of Agriculture. However, due to the valuable information obtained by Dr. Wolfe’s work in the survey, his results are used as the basis of this publication.

Appreciation and credit are extended to Dr. Wolfe for his leadership, analysis and contributions to the survey and to this publication. Appreciation is also extended to Dr. Kim Jensen, Mrs. Wanda Russell, Dr.

George Smith and Mr. Stanley Trout who served on the peer review and editing committee for this publication.

While the information in this document is based on survey data obtained from elementary schoolteachers and is intended for the specific use by those involved with or considering agritainment enterprises, it should be used as a companion to Extension publication “**Considering an Agritainment Enterprise in Tennessee**,” PB 1648.

It should be noted that this publication is intended to serve as a summary of the results obtained in the survey. Interpretation and application of the information should be done with caution and should serve as a guide rather than a recommendation of action.

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*Agricultural Development Center*

# Targeting School Groups for Agritainment Enterprises: A Summary of Schoolteacher Survey in Tennessee

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## Introduction

The past few years have witnessed an increased interest in agritainment activities (agritourism and entertainment farming) on Tennessee farms. Animal petting pens, pumpkin patches, hay-bale and corn mazes, farm tours and farm festivals have become almost commonplace across the state. Other agritainment activities such as children's camps, corporate events and cabin rentals are also being implemented. These and other agritainment activities have created new uses for many farm resources and have contributed to additional sources of farm revenue.

Often begun as educational and awareness programs, many agritainment activities have been developed from small-scale, hobby-type activities into full-time, primary farm enterprises. When done as a hobby, it is often difficult to cover all costs and realize a positive net return. Therefore, many agritainment enterprises are being developed as recognizable entities of the total farm operation. With this distinction comes the commitment of many farm resources, including a significant amount of managerial time and farm labor and a significant investment in marketing and promotion.

The primary focus of all marketing and promotion activities must be aimed at attracting visitors to the farm . . . and the more people the better. The primary audiences for agritainment activities are often separated into two classifications: families with children and groups. Groups are often targeted during weekdays, while families are targeted on weekends and holidays. Many different types of groups and several different methods for marketing agritainment activities to them exist. Groups include school groups, senior citizen groups, church groups, civic groups, daycare groups, children and youth groups

and tour groups, just to name a few. Marketing methods may include brochures, print, radio, Internet, television, signs, sponsorships, use of a logo and positive word-of-mouth comments and referrals.

The effectiveness of different promotion tactics often varies with particular groups targeted. Therefore, understanding a particular target group can be extremely helpful in planning and developing a promotional strategy. Because school groups are considered a good target audience for agritainment activities, obtaining a good understanding of their preferences, constraints and opinions can be helpful to farm families considering or enhancing an agritainment enterprise.

School groups are often considered good target audiences for agritainment activities for a variety of reasons. Some of the reasons are:

- most school classes take field trips
- farm and agritainment activities can easily relate to educational curriculums
- school classes are accustomed to planning and taking field trips and have an infrastructure to do so
- individually or collectively, school classes tend to represent large numbers of individuals (i.e., average classes may have 20 students, an average grade level may have 100 students, an average school may have 600 students and an entire county system may have thousands of students)
- school groups normally have a specific point of contact (teacher) who understands the group's constraints and provides leadership for arrangements

Many successful agritainment enterprises rely on school groups for a bulk of

their business. Especially during October, school buses flock to pumpkin patches around the state, sometimes unloading more than 200 students each hour. At a per-person fee of up to \$6.00, agritainment enterprises can generate substantial revenues. However, there are often many challenges to developing a thriving, multi-thousand-dollar enterprise. First, you must get the people to the farm. Then, they must have an enjoyable experience. And finally, they must be convinced that they will have an equally pleasing, new experience if they return the next week, the next month or the next year. Each of these areas requires a great deal of work.

Attracting visitors to the farm initially requires development of a high-quality enterprise and high-quality marketing/promotion plan. Keys to insuring a quality experience include a well-planned and well-executed agenda from arrival to depar-

ture, a safe environment and a good value. To ensure repeat visits, customers must realize that their next visit will be equally pleasing, yet different enough to decrease chances of repetition or boredom.

Keep in mind that different groups have different expectations. That is, the expectations and requirements of a senior citizen group will differ from those of a kindergarten class. So, targeting different groups may require different promotion methods. Because elementary school classes can be such a vital target market for agritainment activities, a survey of elementary schoolteachers in a six-county area was conducted by the *Agricultural Development Center* in the spring of 1999 to identify the needs, expectations and desires of school groups. This publication is devoted to summarizing the results of the school-teacher survey.

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## The Survey Sample

The survey targeted public schoolteachers in kindergarten through fifth grade. A one-time, mail survey was used. A total of 1,202 surveys were mailed to 95 public elementary schools in a six-county area around Knoxville, Tennessee. The six counties included in the study were Hamblen, Grainger, Cocke, Jefferson, Sevier and Knox. Elementary schools were identified and a packet of surveys, accompanied by a cover letter that explained the importance and purpose of the study, was mailed to the school's secretary. Inside the survey package was a memo asking the secretary to place a questionnaire in each elementary teacher's school mailbox. The elementary schoolteachers were asked to complete the postage-paid questionnaire and return it to the *Agricultural Development Center*. A total of 201 questionnaires

were returned for a response rate of 16.7 percent. Table 1 summarizes the return rate by grade level. The return rate was not uniform, with some counties having a higher return rate than others.

Kindergarten	33%
First	21%
Second	13%
Third	13%
Fourth	12%
Fifth	8%

## Market Potential

Elementary schoolteachers indicated a strong interest in farm field trips. When asked how likely they would be to take a farm field trip, 63 percent of the teachers said they would be very likely, while a total of 90 percent were very likely and somewhat likely to do so. Table 2 presents the likelihood of teachers by grade level to take a farm field trip.

A number of different field trip opportunities are available to schoolteachers and their students. Therefore, determining the

number of field trips that various grade levels take over the course of a year is very important in assessing the level of competition for an agritainment enterprise. On average, it appears as though elementary classes take between three and four field trips each school year. On average, kindergarten students take four field trips per year. Table 3 presents the average number of field trips taken by each grade level. The average number of field trips taken each year did not vary substantially by grade or by county.

**Table 2. Likelihood of Teachers to Take a Farm Field Trip**

Likelihood	Grade Level						
	Kindergarten	First Grade	Second Grade	Third Grade	Fourth Grade	Fifth Grade	Average*
Very Likely	82%	62%	71%	52%	29%	33%	63%
Somewhat Likely	17%	35%	14%	35%	48%	33%	28%
Somewhat Unlikely	2%	0%	0%	9%	10%	17%	4%
Very Unlikely	0%	3%	14%	4%	14%	17%	6%

**Table 3. Average Number of Field Trips Taken by Grade Level**

Kindergarten	4.0
First	3.5
Second	3.2
Third	3.3
Fourth	3.8
Fifth	3.5

Because school field trips are often planned on an individual class or grade-level basis, it can be important to have some information about the number of students and adults to expect from each class. Knowing the class size will help determine the amount of labor that will be needed for a particular group. According to the survey, the average size kindergarten through fifth grade class is 22 students and five adults. Table 4 presents the average number of students and adults per class by grade level.

\*In tables that present data by grade level and average, the average column/row presents straight averages across

all grade levels, not weighted averages and therefore should be interpreted with caution.

<b>Table 4. Average Number of Students and Adults Per Class by Grade Level</b>		
<b>Grade</b>	<b>Number of Students</b>	<b>Number of Adults</b>
Kindergarten	22.5	5.5
First	18.2	5.2
Second	23.5	5.3
Third	19.1	4.1
Fourth	23.1	4.8
Fifth	32.8	5.6
<b>Average</b>	<b>22.4</b>	<b>5.2</b>

In addition to competing with other field trip opportunities, an agritainment enterprise should only be targeted to those school groups within a reasonable distance of the farm. A reasonable distance may be determined in minutes or miles. Table 5

presents the maximum distance (in miles and minutes) that teachers indicated they would travel for a field trip. According to these results, agritainment enterprises should be targeted to schools within 35 miles and 45 minutes of the farm.

<b>Table 5. Maximum Distance and Time That Teachers Will Travel for a Field Trip</b>							
<b>Distance</b>	<b>Grade Level</b>						
	<b>Kindergarten</b>	<b>First Grade</b>	<b>Second Grade</b>	<b>Third Grade</b>	<b>Fourth Grade</b>	<b>Fifth Grade</b>	<b>Average</b>
Miles	30.4	37.7	35.4	31.1	38.1	41.4	34.7
Minutes	42.0	50.6	45.9	43.5	47.0	57.7	46.3

## **Price Determination**

Getting an idea of how much school groups will pay for an agritainment farming experience can be difficult. One method might be to evaluate the prices they normally pay for field trip activities. Obtaining an understanding of the cost limits teachers use in planning their field trips provides useful information in setting the per-student field trip price. The field trip's price must be high enough to cover

associated costs, yet not so high that it discourages participation. According to the survey, teachers do indeed have cost limits for their field trips. Exceeding these limitations could exclude an agritainment enterprise from a teacher's consideration as a potential field trip. The survey found that the upper limit for field trip costs was about \$6.80 per student. This figure is an average of all grade levels and may vary

according to the nature of a field trip and the associated activities. Table 6 presents the average upper cost limit for field trips by grade level.

<b>Table 6. Average Upper Cost Limit for Field Trips by Grade Level</b>	
Kindergarten	\$6.93
First	\$6.03
Second	\$6.44
Third	\$7.73
Fourth	\$6.16
Fifth	\$8.03
<b>Average</b>	<b>\$6.79</b>

Knowing the upper price limit is helpful, but it does not mean that an agritainment enterprise can succeed at that price. The important thing to remember about pricing is that the customers must perceive the experience to be a good value compared to the price. However, it is important to remember that just because teachers

consider \$6 to \$7 as the upper cost level, they still expect a quality field trip. The upper price level allows the agritainment operator to work backwards and see what products and service can be provided at various prices.

A simple scenario was tested among schoolteachers to determine their willingness to pay for a fictitious farm field trip. The scenario describes an agritainment enterprise where students could take a hayride across the farm to a pumpkin patch and then pick their own pumpkin. Other activities described in the fictitious field trip included allowing the children to paint their pumpkins and to hear a Halloween story. A picnic area was also provided in the scenario, but the class was responsible for bringing their own food. The facilities would also include a limited play area. Teachers were asked if they would pay \$3, \$5 or \$6 for the aforementioned field trip. The results of the teachers' willingness to pay different prices for the described agritainment field trip are presented in table 7 by grade level.

<b>Table 7. Teachers' Willingness to Pay for the Described Agritainment Field Trip</b> (figures represent the percent of teachers in a particular grade level who were willing to pay the specified price per person for the described field trip)			
<b>Grade Level</b>	<b>Per Person Price Level</b>		
	<b>\$3.00</b>	<b>\$4.00</b>	<b>\$6.00</b>
Kindergarten	95%	39%	10%
First	100%	34%	6%
Second	100%	58%	29%
Third	92%	38%	9%
Fourth	96%	65%	5%
Fifth	78%	23%	8%
<b>Average</b>	<b>95%</b>	<b>42%</b>	<b>10%</b>

The willingness to pay for the example field trip decreases significantly with each price increase. Nearly all of the teachers were willing to pay \$3, only a third of the teachers were willing to pay \$4 and less than one in 10 teachers were willing to pay \$6 for the fictitious farm field trip. This

simple scenario reveals the price sensitivity of the teachers surveyed. Therefore, once an agritainment enterprise is in operation, it will be important to obtain feedback about the value of the enterprise and the price charged.

## Scheduling School Field Trips

Understanding when most school field trips are taken not only helps an agritainment enterprise better plan to host school groups, but it can help identify times when other groups should be targeted. There is, however, a difference in the time teachers **plan** a field trip and the time they actually **take** a field trip. Teachers tend to plan their field trips before the school year begins or at the beginning of the school year. However, some teachers indicate that they plan field trips through-

out the school year. Understanding when teachers plan their field trips can also help an agritainment entrepreneur schedule the timing of promotions. Similarly, understanding when teachers take field trips can help determine when school-related activities should be featured at the farm. Table 8 presents the percentage of teachers we plan their field trips at various times of the year, while Table 9 shows the percentage of teachers who take field trips at various times of the year.

Table 8. When Field Trips Are Planned (percentage of teachers who plan their trips at each of the given times)							
When Planned	Grade Level						
	Kindergarten	First Grade	Second Grade	Third Grade	Fourth Grade	Fifth Grade	Average
Beginning of school year	49%	40%	46%	41%	35%	30%	43%
Throughout school year	20%	24%	39%	35%	12%	20%	23%
Before school year	11%	16%	8%	12%	35%	50%	18%
Beginning of year and January	7%	8%	8%	6%	0%	0%	6%
Fall / spring	2%	4%	0%	0%	6%	0%	3%
A month in advance	7%	0%	0%	0%	0%	0%	3%



<b>When Taken</b>	<b>Grade Level</b>						
	<b>Kindergarten</b>	<b>First Grade</b>	<b>Second Grade</b>	<b>Third Grade</b>	<b>Fourth Grade</b>	<b>Fifth Grade</b>	<b>Average</b>
Fall & Spring	25%	25%	67%	67%	60%	17%	36%
Fall, Winter, Spring	6%	0%	11%	33%	0%	33%	9%
September, October, May	0%	19%	0%	0%	20%	0%	7%
October, April, May	25%	0%	0%	0%	0%	0%	7%
Depends on availability	0%	13%	11%	0%	0%	0%	6%
October, February, March	13%	0%	0%	0%	0%	17%	5%
December & Spring	13%	0%	0%	0%	20%	0%	5%

## **Important Field Trip Components**

The best way to sell a product is to offer a product that people want. This holds true for farm agritainment enterprises. Whether teachers plan field trips by curriculum, grade level or mere availability can influence both the theme of an agritainment enterprise and the promotion tactics used to attract school groups. According to the survey, elementary schoolteachers are very interested in scheduling field trips related to the materials they are teaching and that are educational and informative. The teachers overwhelmingly indicated that an educational trip related to their curriculum is very important in their field trip selection criteria. Table 10 presents the percentage of teachers, by grade level, who use certain criteria when selecting field trips.

Given these results, it is obvious that elementary teachers prefer to select field trips that relate to a teaching curriculum. Therefore, it should be worthwhile for an

agritainment enterprise to gain a better understanding of what elementary school children learn about. A general understanding of the topics they cover in science and other related subjects may provide additional ideas that could be incorporated into a farm field trip. By incorporating educational activities in the agritainment enterprise so the students are actually learning about topics related to their classroom curriculum, an agritainment business may increase the likelihood of attracting school groups.

In addition to curriculum, elementary schoolteachers consider interactive or hands-on experiences to be very important in selecting field trips. Table 11 presents several factors and how important teachers of each grade level feel they are in selecting a field trip.

Again, this information is valuable in that it provides direction to the type of activities

<b>Table 10. Percent of Teachers Who Use Various Criteria to Select Field Trips</b> (figures represent the percent of teachers in a particular grade level who use certain criteria in selecting a field trip)			
<b>Grade Level</b>	<b>Selection Criteria<sup>1</sup></b>		
	<b>Curriculum</b>	<b>Grade Level</b>	<b>Availability/Interest</b>
Kindergarten	59%	35%	0%
First	55%	36%	9%
Second	63%	25%	13%
Third	67%	17%	0%
Fourth	17%	0%	33%
Fifth	50%	0%	50%
Total	55%	26%	10%

<b>Table 11. Important Factors in Selecting A Field Trip</b> (the percentage of teachers within each grade level who indicated a particular factor was important)							
<b>Factors</b>	<b>Grade Level</b>						
	<b>Kindergarten</b>	<b>First Grade</b>	<b>Second Grade</b>	<b>Third Grade</b>	<b>Fourth Grade</b>	<b>Fifth Grade</b>	<b>Average</b>
Curriculum/class studies	57%	61%	61%	59%	38%	33%	52%
Hands-on, interactive	45%	32%	50%	14%	38%	27%	37%
Fun, enjoyable, interesting, exciting	20%	24%	27%	18%	29%	33%	23%
Educational, informative	17%	19%	14%	9%	43%	54%	21%
Age-level appropriate	27%	16%	9%	9%	0%	7%	16%
Unique, new experience	15%	5%	9%	9%	5%	0%	9%
Cost	3%	11%	9%	5%	10%	13%	7%
Distance, location	3%	5%	5%	9%	5%	13%	6%
Safety, organized	5%	0%	4%	9%	4%	13%	5%
Cultural	0%	3%	9%	4%	4%	7%	3%
Facilities	3%	0%	0%	4%	9%	0%	3%
Activities	5%	3%	5%	0%	0%	0%	3%

<sup>1</sup> Those who select field trips based on “curriculum” likely prefer that field trips relate to a subject, topic, lesson or educational curriculum being studied. Those who select field trips based on “grade level” likely are required to take the same field trip as other classes in their grade level or are restricted from taking a field trip that another grade level takes. Those who select field trips based on “availability/interest” likely prefer trips that fit their schedule and interest.

the farm should offer and how to promote them to school groups. For example, a curriculum activity at the agritainment enterprise could include planting a seed in a small container. This would provide each child with an opportunity to plant a seed at the farm with instructions on how to care for and nurture the plant at home or in the classroom. This ties into agriculture, as well as into the spring theme of rebirth and growth. By including hands-on activities for students, the agritainment enterprise becomes an extension of the in-class curriculum.

In addition to providing a hands-on field trip experience that is related to a classroom curriculum, the trip must be enjoyable for the children. You may have the best educational material and picturesque setting, but if the children do not enjoy the field trip, teachers may not return. The purpose of the field trip is to provide children with a fun, new venue for learning. If the activities and experience are not fun, children will lose interest and divert their attention to other non-related activities like talking, playing and getting out of control.

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## Marketing Agritainment Enterprises to Schoolteachers

Understanding why teachers have not participated in farm field trips in the past could be helpful in evaluating the competition and targeting promotions to school groups. Nearly one third of the elementary schoolteachers interviewed in the ADC's survey did not take a farm field trip during the previous year because they were unaware of any such enterprises. This is surprising because a number of farm-tour opportunities are located within 30 miles of the six-county area in which the teachers were surveyed. Therefore, schoolteachers appear largely unaware of available farm-tour and agritainment enterprises.

Another reason teachers indicated they did not take a farm field trip was that "other grades take that trip." This reason may imply that in some schools, field trips may only be taken on a grade-level basis (various grades cannot take the same field trip). This is not necessarily negative, but it may mean that an agritainment enterprise must stress that a variety of age-appropriate activities will be offered at the farm. That is, the enterprise may feature hand-milking a cow for fifth-graders, a corn maze

for third-graders and a pumpkin patch and hayride for first-graders. By offering a variety of "activities" or different field trip alternatives, each focused on different grade levels, a farm enterprise may be able to overcome the obstacle of attracting only one grade level. Table 12 presents the percentage of teachers in each grade level who did not take a farm field trip in the previous year for the selected reasons.

Given the large percentage of teachers who were unaware of farm field trip opportunities, it is essential that the agritainment enterprises be aggressively marketed and promoted to schoolteachers. Apparently, the most effective marketing and promotional media is word of mouth. Nearly eight of 10 teachers indicated they learned about field trip opportunities via word of mouth. This may mean that teachers who have a satisfactory experience at an agritainment enterprise will be the best form of advertisement and promotion to other teachers. Therefore, efforts should be focused on not only getting groups to the farm, but on making sure they have a great experience while there.

Word-of-mouth advertising can impact a business both positively and negatively, depending on an individual's experience. If a teacher, student and/or parent visits a farm and has a less-than-satisfactory experience, they will pass this information on to others. Table 13 presents the percentage of teachers who learn about field trip opportunities by a variety of methods.

Following word-of-mouth, brochures and flyers were the methods mentioned

most often. Therefore, creating an attractive and informative agritainment brochure/flyer should be included in an enterprise's overall marketing and promotion plan. More than four of 10 teachers indicated they learn about field trip opportunities via brochures and flyers. About two-thirds of teachers indicated the best way to inform them of field trip opportunities is to mail them something. In addition to mailing information, it may be a good idea to distribute brochures/flyers in person

<b>Table 12. Percentage of Teachers Who Did Not Take A Farm Field Trip for Selected Reasons</b>							
<b>Reasons</b>	<b>Grade Level</b>						
	<b>Kindergarten</b>	<b>First Grade</b>	<b>Second Grade</b>	<b>Third Grade</b>	<b>Fourth Grade</b>	<b>Fifth Grade</b>	<b>Average</b>
Not aware of any	31%	30%	40%	29%	47%	43%	36%
Another grade takes that trip	15%	17%	30%	29%	41%	21%	25%
Went somewhere else	19%	30%	5%	5%	0%	0%	12%
Trips planned prior to learning of farm trip	15%	13%	10%	10%	6%	7%	11%
Does not fit curriculum	4%	0%	5%	0%	6%	7%	4%
Money, cost	4%	0%	0%	5%	0%	0%	2%

<b>Table 13. Percentage of Teachers Who Learn About Field Trips by Selected Methods</b>							
<b>Methods</b>	<b>Grade Level</b>						
	<b>Kindergarten</b>	<b>First Grade</b>	<b>Second Grade</b>	<b>Third Grade</b>	<b>Fourth Grade</b>	<b>Fifth Grade</b>	<b>Average</b>
Word-of-mouth	91%	74%	96%	71%	77%	54%	81%
Brochures/flyers	36%	37%	48%	35%	75%	31%	42%
Mail	34%	45%	36%	52%	23%	50%	39%
Newspaper	8%	8%	18%	5%	9%	7%	9%
Bulletins	7%	10%	5%	10%	5%	7%	7%
Mass media	0%	3%	5%	5%	5%	7%	3%

at schools at the beginning of the school year. Schools generally have teacher in-service training days prior the opening of the school year. This could be a great time to provide teachers with information about an agritainment enterprise. In addition,

brochures and flyers should be handed out at the farm and circulated in the community. This will increase exposure of the business and may reach teachers and parents who did not received the information somewhere else.

## Activities and Facilities Needed

In addition to a quality experience that relates to a classroom curriculum, teachers tend to have certain expectations of general field trip activities and facilities. Among these, restrooms, eating area and learning centers are very important. While

a play area was the least important feature, it was desired by almost half of the teachers in the survey. Table 14 presents the percentage of teachers who believe certain activities/facilities are a necessary part of a field trip.

Activity/Facility	Grade Level						Total
	Kindergarten	First Grade	Second Grade	Third Grade	Fourth Grade	Fifth Grade	
Restrooms	95%	97%	100%	100%	92%	87%	96%
Eating area	82%	89%	79%	76%	83%	80%	82%
Learning centers	76%	87%	100%	83%	75%	73%	81%
Play area	48%	60%	47%	38%	41%	50%	48%

## Conclusions

Substantial market potential exists for agritainment enterprises in Tennessee. School groups are often considered one of the primary target markets for farm tours and field trips. However, to compete with the many other field trip opportunities available to school groups, agritainment enterprises must understand the preferences, constraints and needs of teachers.

On average, elementary classes take about 22 students and five adults on each field trip and tend to pay less than \$7 per person. On average, teachers prefer to drive less than 35 miles and less than 45 minutes to a field trip destination.

Most teachers plan their field trips either at the beginning of the school year or before the school year starts. Most field

trips are taken in the spring and fall. Most teachers prefer to select field trips that have a relation to their class curriculum. In addition, many field trips are selected because of grade level constraints, hands-on/interactive components and the level of fun and enjoyment. Teachers also indicate that restroom facilities, an eating area and learning centers are necessary for school field trips.

In general, elementary schoolteachers are interested in farm field trips. However, many teachers are simply not aware of such opportunities. Sometimes, teachers are not able to take a certain field trip because another grade-level already takes that type of trip. This may imply that some schools do not allow the same field trip to be taken by different grades. However, stressing a variety of age-appropriate activities may enhance an agritainment enterprise's chances of attracting more than one grade from a single school. As is

the case for many local value-added businesses, word-of-mouth advertising is the most frequent way teachers learn about field trips. It is important to remember that providing a high-quality, good-value agritainment experience is the best way to influence word-of-mouth advertisements. In addition, one of the best ways to heighten awareness about agritainment activities by schoolteachers is through brochures and flyers.

To maximize returns, agritainment enterprises should host as many groups as their resources will support. That is, a plan should be considered that allows numerous groups to be at the farm at the same time. According to the study, the average amount of time that classes stay at a field trip location is two hours. Without sacrificing safety or quality, an agritainment enterprise should be able to host several groups and numerous individuals in a day.

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# Nature-Based Tourism & Agritourism Trends: Unlimited Opportunities

James A. Maetzold, National Alternative Enterprises and Agritourism Leader, USDA/NRCS, Washington, DC

If you own and operate an agritourism or alternative enterprise or have visited an agritourism farm or purchased products directly from a farmer, you are supporting your local farmer.

## Introduction

Rural tourism has been increasing rapidly over the last two decades. Many factors have contributed to this trend. Briefly, people are taking more and shorter trips, doing more traveling by car, combining business travel with vacations, looking for new experiences, adding diversity to their experiences, traveling as a family, and looking to "get back to their roots." In most cases, one family member has a grandparent who grew up on a farm/ ranch or in a rural community. These are the "roots" tourists want to visit.

I have five take-home points I would like you to learn from my presentation: (1) What are alternative enterprises and agritourism? (2) tourism trends and projections, (3) income-producing ideas, (4) available resource material, and (5) tourism ideas for Oklahoma. My goal is to get you to think outside the box about your farm/ranch and rural community. How can you use your natural and human resources differently for income-producing opportunities? Or, as George DeVault of the Rodale Institute says, "Get small and get in."

## What are Alternative Enterprises and Agritourism?

1. An "alternative enterprise" is marketing what you produce differently, adding value to the product you produce or adding a new enterprise. It is also using your natural or other resources differently or using the same resource in multiple ways.

2. Agritourism is an alternative enterprise where you invite the public onto your farm or ranch. It can also be defined as "a set of activities that occur when people link travel with the products, services, and experiences of agriculture." The product itself can be an "experience."
3. Agritainment is the fun side of agritourism and includes mazes, petting farms, pumpkin picking, haunted houses, horseback riding, and the like.
4. Agrieducation is teaching your visitors about agricultural production, how food and fiber are produced, rural values, and quality of life. It is building support for agriculture through educational experiences. I have no data to prove this point! But I firmly believe that farmers and ranchers like you teach more people about agriculture than any other form of education in the United States. When they visit your farm, you have children's undivided attention for twenty minutes to an hour to teach them about their food and how farmers and ranchers produce it. At the same time you teach, you also provide an experience about cultural and heritage tourism, two of the fastest-growing tourism niches.
5. Nature-based tourism ranges from hunting and fishing (consumptive tourism) to bird watching, flower/tree/rock identification, hiking, rock climbing, or just being with nature (nonconsumptive tourism), and
6. Avitourism or bird watching is the fastest growing nature-based tourism activity in the nation.

## Twenty-First-Century Agriculture-Consumer

### About James Maetzold

"I was born and raised on a small grains and livestock farm in North Dakota. I have been a Federal employee for over 39 years. I began my career in the US Army followed by two years as county extension agent in North Dakota. Following graduate school in agricultural economics at North Dakota State University and University of California, Davis, I have worked in Washington, D.C., since 1969. I have had the opportunity to work for the Economic Research Service, Farmers Cooperative Service, Farmers Home Administration, Executive Office of the President, and the Natural Resources Conservation Service for the last 22 years. I worked on the Soil and Water Resources Conservation Act for 17 years and as the National Alternative

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## Industry Structure

Today's agricultural production, marketing, and distribution system can be described as an hourglass. We have more than two million farmers/ranchers producing the nation's food who sell to a few firms that add value through processing, packaging, and transporting, like the neck of the hourglass, and then sell it to the 290 million domestic and foreign consumers. These firms incur the costs, risks, and management, add value, and store and transport these products before they are sold.

With alternative enterprises, the farmers "add value" to their own products and realize a larger income by performing marketing activities and incurring the risks by processing, packaging, storing, transporting, and selling directly to the consumer. The farmer becomes a competitor with agribusiness firms for a larger share of the consumer's dollar.

In 1913, farmers received 46 percent of the consumer's dollar compared to less than 20 percent today. This occurred because many small farmers carried out the marketing at the local level such as delivering milk, manning the butcher and bake shop, and selling "in-season produce," or consumers visited farms to buy directly from the farmer/rancher. In 1950, farmers received 50 to 80 percent of the consumer's dollar spent on fruits and vegetables. Today, the figure is less than 30 percent.

A farmer or rancher entrepreneur who diversifies into value-added agriculture or agritourism has several market opportunities. These can be categorized as: food (processing, packaging, branding, specialty markets, farmers' markets), roots (heritage and culture), agrieducation (schools, retreats, conferences), experiences (farm stays, ranch stays, B&Bs pick-your-own), agritainment (petting farm, mazes, hayrides), and nature-based adventure (horseback riding, rock climbing, hunting, fishing). Most entrepreneurs develop several of these activities as alternative enterprises or as their agritourism activity grows. It is a natural fit. You have a very important and responsible job: You are developing friends for agriculture forever! It is not just for the profit! This fits nicely into the values of rural America.

## Income-Producing Opportunities for Your Farm or Ranch and Community

Agritourism or any other alternative enterprise is a different business than farming. Two major changes will occur. First, you are no longer a price-taker but a price-setter. You are not going to the elevator or livestock auction and asking, "What will you give me?" Now, you are telling the consumer how much you want for your product or service. Secondly, you are now in the people business. You are working directly with the consumer in a relationship just as important if not more important than the product

you are selling. Someone in your family must enjoy working with people to succeed at agritourism or other alternative enterprises. You are marketing directly to the consumer. You are producing memories, adventure, experiences, and friendships.

Thinking about the "customer" is probably more important than thinking about "production" in this scenario.

When you think about your customer, you must think about how you operate your business. When are you going to be open? How many people will you hire? What type of facility will you need? How small can you be to start? These are just a few of the questions you will need to answer when developing an agritourism or other alternative enterprise.

These farm or ranch income-producing opportunities may be put into fourteen groups:

1. **Farm Markets and Specialty Products**—These markets provide an excellent opportunity to sell all types of value-added products from food to crafts, depending upon the rules of the farmers' market. Specialty product markets exist everywhere. The Internet has made this a more easily accessible market. Also, many farmers are now marketing to restaurants, schools, and nursing homes. Many state government and local communities support this type of activity. If they don't, help them get started!
2. **Product Processing**—These products include maple syrup, wood products, dairy products, and wine production, to name a few. They can become an education activity as well as resulting in product sales. The ideas are almost limitless as to what you can do with product processing and packaging. Customers like to shop, so you need to provide them with the opportunity to take something home for themselves or for friends.
3. **Fairs, Festivals, and Special Events**—Farms hold festivals as well as communities. People just need something to rally around. These festivals range from food and crafts to nature, flowers, art, heritage, and cultural themes. Farmers have found festivals to be a very profitable way to attract customers. Many economic development or chamber of commerce groups will sponsor these events. Plan your activities around these festivals or hold your own.
4. **Horses and Other Farm Animals**—This can range from petting farms to the training of horses or raising buffalo. These enterprises can be educational, produce food, fiber, and fun, or develop skilled horsemen. Exotic animals often attract many visitors. Many entrepreneurs raise llamas, sheep, and other fiber-producing animals. They market the fiber in both the finished and unfinished form and sell the meat and

in some cases milk to local customers. Some dairy goat producers deliver milk more than three hundred miles. Others have raised ostrich and emus. The changing diversity of the American population has led to the development of many niche markets for goats, sheep, and other livestock products.

5. **Unique Dining Experiences**—Opportunities exist for farms and ranches to serve food to the public. You may have a special location and setting with a view, provide plays, or other entertainment, develop a catering service, or have a dining/fun experience on the farm with great country cooking. People are looking for a new experience, and dining on the farm is a "new experience." Dining is the number-one tourist activity!
6. **Wildlife and Fish**—This includes fish production, bird watching, hunting, and fishing. You can raise several different species and release the game birds for hunting or manage your land for improved game habitat. You can offer guided or unguided hunts.
7. **Nature-based Recreation**—Opportunities exist on farms and ranches to market natural resources as nature-based recreation for a fee. These include hiking, biking, walking, snowmobiling, all-terrain vehicles, swimming, canoeing, float trips, boating, picnicking, water-skiing, paintballing, and other outdoor team sports. Water-based activities are a very popular form of outdoor recreation.
8. **Floriculture**—The raising and marketing of flowers at farmers' markets, community supported agriculture groups, and other markets have increased rapidly in the past decade. Fresh flowers on the table have a high priority in most of our homes today. In addition, one can raise bedding plants for the wholesale and retail markets as well as wildflowers and herbs. There are many niche markets for floriculture products. It is surprising how much people will pay for fresh cut flowers.
9. **Education**—Education can become a part of almost every agritourism and alternative enterprise. Education may even be the focus of the enterprise. Either approach provides for many income-producing opportunities on the farm and ranch. Public and private education systems are looking for ways to broaden students' educational experiences. Most schools are open to an invitation to visit your farm once you explain your education program. Be sure to have different programs for the various age groups, from preschool to senior citizens.
10. **Heritage and Culture**—This is one of the fastest-growing tourism activities. American and foreign visitors are very interested in the history of the United States. Since most people come from an agricultural ancestry, they want to learn more about what their great grandparents or grandparents did for a living. This is a great opportunity to sell the rural "quality of life." Agriculture has a tremendous heritage and culture that can also be marketed to tourists by people staying and/or working on the farm or ranch. The more original the better, including the antiques, claim cabins, homesteads, and the like.
11. **Arts and Crafts**—Tourists' second-favorite activity is shopping. Local arts and crafts have always been in demand by domestic and foreign tourists. This includes food items and other value-added food products produced on the farm. Quality products are needed to attract and keep tourists coming back. There are several regions in the United States where journeyed crafters live and market their products. They have succeeded in establishing high-quality products and experiences for the customer.
12. **Farm/Ranch Stays**—There are three types of stays: vacation (visitors are looking for rest and relaxation), working vacation (visitors participate in the farm/ranch daily chores and work), and dude ranches/farms (visitors are specially treated by staff members, who do all the necessary preparation for the activities during their stay).
13. **Tours and Touring**—These enterprises are generally tied to activities involving a group of farms/ranches or community festivals or events. Tourists travel to see foliage or blossoms or farm harvest activities such as maple syrup, cheese, or ice cream processing or events such as threshing bees or fall harvest activities. Either a group of farmers or a community/county sponsors such events. It is a time to open your enterprise to the public.
14. **Pick, Cut, Gather or Grow Your Own**—Farmers have been selling the pick-your-own fruits and vegetables events for decades, and some have been renting land to people who want to grow their own. A relatively new enterprise is rent-a-tree, cow, or bush.
 

Here the farmer still maintains complete control in the production management aspects and the customer pays the farmer for these services. For example, you can rent/lease an apple tree to a customer. You still prune, spray, and perform the functions involved in production. The customer is invited to watch the pruning, see the apple blossoms, and watch other production practices. When the apples are ready to pick, the customer can bring friends and pick whatever quantity they want from the tree they rented. The farmer then harvests the remainder for himself.

This type of program allows the farmer to get the customer to visit his farm several times a season, providing opportunities for sales of other value-added items and development of a loyal relationship.

We have just identified several agritourism and alternative enterprises possible on your farm or ranch. I suggest talking these ideas over with neighbors, your local extension agent, or other entrepreneurs. This is a difficult time for most farmers/ranchers; they are concerned their neighbor will do the same thing if they talk to them about their ideas. This should not be a concern because research has proven that the more tourist attractions there are in an area, the more people will come. Customers recognize they have an opportunity to pick and choose. Don't be afraid of getting your neighbor involved in an alternative enterprise a little bit different than yours. This is where teamwork really pays off.

As you start to develop your business, you will need to consider the type of customer you want to attract or serve. For example, do you want to lease your place to hunters who guide themselves and hunt whatever game is in season for about \$1,500 per week, raise and release game, or manage your game so there are more trophy animals available and provide guided hunts for \$12,000 per week? These decisions need to be made when you are developing your business and marketing plan.

Some people get very nervous as they think about these new and different enterprises. You need to look at it the same as you do new farm and ranch production practices: Read about them, attend seminars, talk to peers, read research reports, and discuss with technical staff. Finally, try to test your new business by selling your services or products to family, friends, church groups, and other civic groups. Don't make a big investment immediately. Build and learn.

The NRCS has a put together a publication (see resource list) describing seventeen success stories. The stories tell you how people started and built their business, the mistakes they made, and how they took advantage of things that went right.

### **Tips for Staying on Track and Getting Started**

#### ***(Recommended for a one to two-year period)***

#### **1. Assess your resources–**

- Look at the notes you have made in considering alternative enterprises and use them to make a more in-depth assessment of the resources available to you and your family.

#### **2. Get informed–**

- Attend seminars, workshops, trade shows, and schools.
- Purchase books, videos, newsletters, magazines,

and other publications.

- Go to the library and do some research. Use the Internet to get the most up-to-date information. If you don't have an Internet connection at home, one should be available to you at the library.
- Look through the resources listed in the NRCS "Alternative Enterprises and Agritourism: Farming for Profit and Sustainability" tool kit available at your area Resource Conservation & Development Office.

#### **3. Find out what other entrepreneurs are doing–**

- Talk to neighbors, friends, and strangers about their businesses.
- Visit businesses in your surrounding area and in neighboring counties and see what they are doing.

#### **4. Consult potential customers–**

- Ask your relatives, friends, and neighbors about the product(s) you are thinking of providing through your new enterprise. Are they interested?

#### **5. Research the market for your products.**

#### **6. Network–**

- Join organizations or groups for people involved in enterprises similar to the one you are interested in.
- Join the chamber of commerce, rotary, and other business and planning organizations or committees in your community.
- See if other local entrepreneurs would like to join you in your business venture or start their own agritourism or alternative enterprise.

#### **7. Get help–**

- Visit resource people in your county, region, or state. County agents, RC&D coordinators, state Extension staff, Department of Agriculture staff, state tourism directors and staff, small business development center staff, and other specialists should all be willing to answer questions and help you get started.

#### **8. Develop a business and marketing plan–**

- Various books, worksheets, and programs designed to help you develop a successful business and marketing plan are available through
  - the Internet
  - your local library
  - your local outreach program
  - your local college
  - SCORE
  - SBDC
  - your local RC&D office

#### **9. Create a financial plan–**

- Decide how you will finance your business.
- Find out about financial assistance (grants and loans) available to you.

### 10. Start small, learn from your experience, and expand the business.

In summary, there are many income-producing opportunities available on your farm and ranch. Search out the ones you are interested in pursuing and that seem of interest to the public. Then gather your information and develop a business plan and a marketing plan. There are many resources and people available to assist you.

#### WHAT DO RURAL TRAVELERS LIKE TO DO?

(Source: Travel Industry Association of America, 2001  
Rural Tourism Travel Poll)

ACTIVITY	PERCENT
Dining	70
Shopping	58
Going to Beach/River/Lake	44
Visit Historical Sites	41
Fishing/Hunting/Boating	32
Attend Festival/Fair	29
Bike Riding/Hiking	24
Attend Religious Service	23
Camping	21
Attend/Participate in Sport Event	18
Visit Winery/Working Farm/Orchard	15
Gambling/Gaming	12
Visit Native American Community	11

#### NATIONAL SURVEY ON RECREATION AND THE ENVIRONMENT: AGRICULTURE RECREATION QUESTIONS

(Preliminary, September 2002)

REASON FOR TRIP	PERCENT
Enjoy Rural Scenery	75
Pet a Farm Animal	67
Source of Information Is Family/Friend	62
Less Nonfarm Development	58
Visit Family or Friends	55
Like to See More Grazing Animals, Orchards, Vines, Woodlands	47-50
Learning Where Food Comes From	48
Watch/Participate in Farm Activities	42
More Pasture, Farmsteads, and Croplands	28-35
Pick Fruit or Produce	28

#### Opportunities for Oklahoma

- **Western theme**— Both domestic and especially foreign tourists enjoy the West, the dress, festivals, rodeos, and culture in general.
- **Heritage and culture**
  - Cowboy and ranching—On-ranch working stays, B&B, dude ranches
  - Oil industry—Most people do not understand the role of oil in Oklahoma.

-American Indians—Both domestic and foreign tourists are interested in Native American history, culture, and handmade products.

-Black history—Most people do not understand the role African-Americans had in developing Oklahoma.

- **Open spaces**—Driving, horseback, camping, bird watching, hunting, and fishing
- **Land and landscape opportunities**—Tourists love to drive, see, and photograph the landscape, especially in the West.
- **Route 66 or Chisholm Trail**—Provides a great variety of activities, and tourists look for this experience and history
- **Hunting and Fishing**—Leases, catch and release, viewing
- **Opportunities lie in the people**—The opportunity lies in you here today and with your friends at home. Just sit back and dream about what you can do. Then, make it a reality.

You have some great resources in Oklahoma. The Resource Conservation and Development Councils (RC&D) of the Natural Resources Conservation Service (NRCS) are very active in developing agritourism and other alternative enterprises. The Oklahoma Department of Agriculture has some very good programs. The Extension Service also has a good support system available to you. You will need to work closely with the tourism industry to have them promote Oklahoma agritourism. This is new to most tourism agencies, so a team effort needs to be implemented.

#### Finally, I want you to continue to THINK OUT OF THE BOX!

NRCS resource material is readily available on the website [www.nrcs.usda.gov/technical/RESS/altenterprise](http://www.nrcs.usda.gov/technical/RESS/altenterprise) or you may order it by contacting Jim Maetzold at (202) 720-0132 or email, [jim.maetzold@usda.gov](mailto:jim.maetzold@usda.gov)

#### The following information is available free:

- *Agritourism and Alternative Enterprises: Farming for Profit and Sustainability Resource Manual*, 2002 update.

Also available: A 175 page summary of the 3,000 page resource manual

A compact disc version of the manual. Includes websites and lists of people working in the area

- Brochure: "Alternative Enterprises for Higher Profits and Healthier Land"
- Information sheet AE-1, "Alternative Enterprises for Higher Profits, Healthier Land—General Introduction to the topic, including a list of 150 ideas for alternative enterprises
- Information sheet AE-2, "Alternative Enterprises—

- Community-Supported Agriculture"
- Information Sheet AE-3, "Alternative Enterprises—Heritage Tourism"
- Information Sheet AE-4, "Alternative Enterprises—Value-added Agriculture"
- WSSI Technical Note 1: Sustainable Agriculture
- "Taking the First Step: Agritourism and Alternative Enterprise Opportunity Identification Guide (Making the Right Decisions to Sustain Your Farm or Ranch and Natural Resources)—Draft
- Stories (17) in Agritourism and Nature-Based Tourism and Alternative Enterprises
- Press Release Drafts
- Alternative Enterprises and Agritourism Information—Talking Points, Definitions, Key Points for Speeches, Media, and Workshops.

#### **Funding Sources and Other Resource Considerations**

1. Resource Manual Chapter 16 has a number of websites for nonprofit groups and farmers
2. Rural Business Services (RBS)—multimillion—value-added grants in the 2002 farm bill
3. RBS loans and grants—B&I Guaranteed Loan Program, Intermediary Relending Program, RBEG, RBOG, VT, IL, CA examples, recreation approval is pending.

4. Farm Service Agency—Beginning Farmers Program
5. Sustainable Agriculture, Research, and Education (SARE)
6. "Using Free Money to Grow Your Agribusiness" Workshop, AZ
  - Need one-on-one to see how you can make USDA programs work for you and tips on how to use them
  - Grant-writing, proposal review, and competitiveness
7. Small Business Innovation Research Grants (CSREES)
  - Community Food Program
  - Value added
  - Federal and State Market Improvement Program
  - Initiative for future agricultural and food systems
8. Building Better Rural Places—More than fifty programs are discussed. To obtain a copy, go to [www.attra.ncat.org](http://www.attra.ncat.org) or call (800) 346-9140
9. Business planning and marketing—Such as NxLevel, Fasttrack, Chapters 12 and 15 of the Resource Manual
10. Small Business Development Centers
11. Chamber of Commerce
12. County Extension Educator
13. Convention and Visitor's Bureau
14. RC&D Coordinator
15. State Departments of—Tourism, Agriculture, and Natural Resources/Conservation

# Bed and Breakfast

*Beginning  
a  
Bed and Breakfast  
in  
South Carolina*



**GUIDELINES FOR  
DEVELOPMENT**

*Beginning  
a  
Bed and Breakfast  
in  
South Carolina*

# **GUIDELINES FOR DEVELOPMENT**

**Dr. Thomas D. Potts, Extension Tourism Specialist  
Clemson University**

**Carole Jones Amos, Rural Development Coordinator  
Community Development Division,  
South Carolina Department of Parks, Recreation & Tourism**

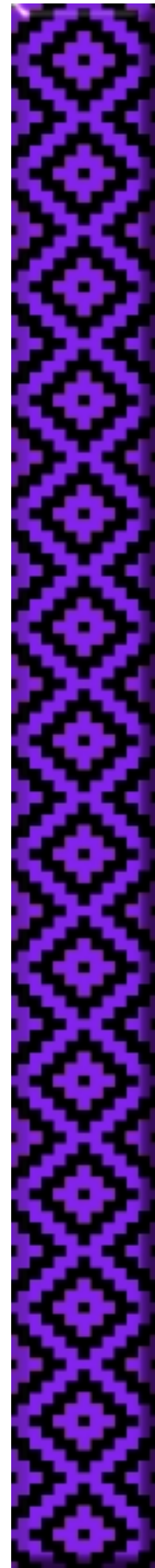
**Strom Thurmond Institute  
Clemson University**





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Country Victoria Bed & Breakfast, Charleston, SC  
<http://www.virtualcities.com/ons/sc/z/scz3701.htm>



1790 House Bed and Breakfast, Georgetown, SC  
<http://www.1790house.com/index.htm>

## I. INTRODUCTION

Although Bed and Breakfast (B&B) operations were possibly the earliest form of accommodations for travelers, in many areas they were completely replaced by inns and hotels. In the United States B&Bs are making a comeback, serving travelers who want a special personal home-like hospitality and a good breakfast to start the day. Today we have over one hundred B&Bs in South Carolina, most of which were started in the past decade,

Owning and operating a B&B can provide both financial and personal rewards for some individuals and families. This manual will provide information needed to decide if operating a B&B is ideal for your situation. If your decision is to began a B&B, the information in this manual will assist you by providing the guidelines for a successful enterprise.

This manual is not intended to serve as a source of planning and health regulations which vary from region to region. Be sure to contact the appropriate regulatory authorities in your area early in your decision-making process.

Additional assistance is currently available both to existing operations and prospective hosts regarding operations, financial planning, and marketing. For additional information contact:

Developing Naturally  
Strom Thurmond Institute of Government & Public Affairs  
Perimeter Road  
Clemson, SC 29634-0125  
Telephone: 864/ 656-0372  
<http://www.strom.clemson.edu/>

Rural Development Coordinator  
Division of Community Development  
SC Department of Parks, Recreation & Tourism  
1205 Pendleton Street  
Columbia, SC 29201  
Telephone: 803/ 734-1449



1790 House Bed and Breakfast



## II. PLANNING AND DEVELOPMENT

### A. Is a Bed & Breakfast for me?

Nicholls-Crook  
Plantation House Bed and Breakfast  
Woodruff, South Carolina  
<http://www.bbonline.com/sc/nicholls/>

Many of us at some time in our lives think about owning our own business. Before starting a venture, it is important to be aware that the majority of small businesses that are started end in failure. Careful analysis of ourselves and our resources in conjunction with proper planning will greatly increase our chances for starting a profitable and enjoyable Bed & Breakfast (B&B) enterprise.

Although you may have had a great experience as a guest at a B&B during a business or vacation trip, you and your family might not be suited to being the gracious, thoughtful hosts that are required for a successful operation.

#### **You should ask yourself the following questions:**

- Does my family like meeting all types of people?
- Do I like to fix attractive, interesting and tasty breakfast dishes?
- Do I like to entertain strangers?
- Do I mind giving up some of my privacy at home?
- Can I always be cheerful and helpful around my guests?
- Is my home always clean and neat?
- Am I successful at managing and organizing my home expenses?

**If “yes” is your response to all of the above questions, you might prove to be a successful B&B owner operator. If your response is less than positive, you would be well advised to consider some other type of endeavor.**

### B. Meet the professionals

One of the first things you should do is talk to those who are operating B&Bs. Bed & Breakfast operations have many characteristics that are unique. Obtain as much insight into other B&Bs as possible before planning your own operation

- Talk to as many B&B owners as you can about their operations and your B&B plans. Don't be afraid to ask simple and complex questions. It is far more efficient to learn from the experiences of others.
- If possible, offer to help at someone's B&B for a few days.
- Take advantage of any educational programs that are available through associations, university extension programs, and state tourism agencies.
- Be sure to review available books, pamphlets and articles for ideas on management, decor, and pricing. (See list in Appendix.)

## C. Defining your bed & breakfast theme

Most guests who visit B&B establishments do so for home-like atmosphere that offers a unique decor and personalized treatment. Every B&B offers a different experience. You must evaluate your home resources and determine what unique qualities you might offer to your guest.

Define the amenities that you might be able to provide at your home such as:

- a scenic view
- antique furnishings
- types of rooms
- library
- fireplace
- swimming pool
- proximity to attractions
- unique menus and services

Seriously consider how well your amenities will meet the potential customer's needs and what image you should market. Be sure to deliberate the following:

- How attractive is the neighborhood?
- How accessible is transportation?
- How close are good restaurants?
- What is your home's image?
- Is the floor plan acceptable?
- Is the kitchen adequate?
- Are there enough bathrooms?
- Do the water and sewage systems work well?
- Are private quarters possible?

Be sure to put your evaluation **in writing**. In your summary ask yourself:

- What makes my B&B concept different and better?
- How will it best serve my guests?
- Does my B&B concept have the potential to become successful?
- How might it grow?



## D. Planning for development

An initial step in the development process is the drafting of a **business plan**. Many wonderful business ideas fail because they were not logically thought out. **A business plan is the framework and includes:**

- **A basic description of your proposed business**
- **The related goals and objectives**
- **How you plan to become successful**

The plan organizes on paper your thoughts of why you are in business, what your market is, what your strengths and weaknesses are, and your financial and management environment. The plan will help you make insightful business decisions and inform potential lenders about your business. An excellent guide to developing a plan is the Clemson University Cooperative Extension Service publication “The Business Plan.”

There are planning considerations in the B&B business that have special industry related characteristics. These variables include:

- **Revenue Forecasting**
- **Start-Up Costs**
- **Operation Expenses**

You should understand these thoroughly prior to starting your plan.

**Revenue Forecasting:** Accurately forecasting sales revenue is an extremely difficult task. Even after you have begun your operation you should continuously review your forecast. Your perception of future sales is the guide to expense and operation planning. Sales revenues are calculated by multiplying the number of rooms rented during a given period by the rate. Your best background information for predicting sales is the data available on past occupancy in your area.

**Occupancy is the measure of the percentage of available rooms that are rented.** The South Carolina Department of Parks Recreation and Tourism, The American Bed and Breakfast Association and reservation service organizations can supply occupancy information. Occupancy varies with seasons, holidays, days of the week, and the weather. The occupancy rate during your first year will depend on your market, the uniqueness of your B&B, and the amount of promotion you undertake. Usually the occupancy rates for new B&B operations are roughly forty percent of the average occupancy rate of the hotels and motels in your area. For example, if the hotels in your area have an occupancy rate of 60 percent in June you might have an occupancy rate of 24 percent that month. However, some rural B&Bs average as low as 10 percent occupancy during the first year.

After estimating your rate for the first year, you should estimate for the second and third years of operation. The occupancy rate for these years will be affected by word-of-mouth recommendations, marketing, and referrals. **A well managed should increase its occupancy by over 10 percent per year.** Projected occupancy alone will not allow you to forecast your sales revenue.

To forecast sales revenues you must also set your room rates. **Revenues are determined by multiplying room rates by occupancy.** Your rates should take into account start up and operational costs. Remember

that the rate you charge should represent “fair value for the dollar.”

There are many factors that influence the value of a room. For example, rooms with private baths, luxury amenities, excellent location, or in a heavy demand area should have a higher rate. Lower rates would be charged for rooms that lack private baths or have single beds. The location and quality of accommodation and services you provide will have a strong bearing on the rates visitors will be willing to pay.

As a rule of thumb, you can probably set a rate somewhere between what a small motel and a large hotel in your area are charging. Check around with other operators in the state and determine the average current rate for your type of bed and breakfast.

## E. Identifying expenses

As a beginning B&B operator you will face both **start-up costs** and **operating expenses**. Start-up cost must also be considered in your B&B plan. Although you might feel that your home is ready for your first guest you will probably find that improvements will be required to create an ideal B&B facility.

**Start-Up Costs:** The first step in determining your start-up cost is to make a list of all the expenses that you will incur. Your estimated cost will help you determine if the B&B concept will profitably work in your home.

Be sure to review your cost list with knowledgeable people in the industry and also make sure that you have covered any costs that might be incurred due to local fire & health ordinance requirements.

**Operating Expenses** will begin when you open for business. These expenses will vary monthly and will be greatly influenced by the number of guests. These expenses will include:

- **food & beverage**
- **soaps, dry cleaning, laundry**
- **office supplies**
- **maintenance**
- **utilities**
- **salary, wages and employee benefits**
- **marketing**



It is important to identify your expenses as accurately, as you can. Your profit is revenue brought in which exceeds your costs. Your expenses will have an influence on determining the rates you must charge to your guests.



TABLE I  
**START-UP COSTS**

**Development Costs:**

Renovations (electrical, plumbing, etc.)	\$ _____	
Redecorations (painting, wallpaper, etc.)	\$ _____	
Other Improvements	\$ _____	
Sub Total	\$ _____	\$ _____

**Other:**

Furniture/Beds	\$ _____	
Fixtures/Furnishings	\$ _____	
Linens/Bedding	\$ _____	
Towels	\$ _____	
Cutlery/Dishes	\$ _____	
Smoke Detectors	\$ _____	
Entrance sign	\$ _____	
Promotion & Advertising	\$ _____	
Permits	\$ _____	
Insurance	\$ _____	
Telephone	\$ _____	
Reservation Service	\$ _____	
Miscellaneous Expenses	\$ _____	
Sub Total	\$ _____	\$ _____
<b>Total Start-Up Costs</b>		<b>\$ _____</b>

## **F. Planning for insurance**

Your current insurance likely will not be suited to the needs of a B&B. Take a close look at your current coverage with insurance professionals and determine what additional coverage is needed.

TABLE 2

## INSURANCE CHECKLIST

Liability (Minimum \$1,000,000)	_____
Comprehensive Personal Liability	_____
Business Liability for B&B Operations	_____
Personal Liability for Non-Owner Host	_____
Products Liability for Food Served	_____
Premises Medical for Business Guests	_____
Premises Medical for Personal Guests	_____

### Property

All Risk Coverage-Building	_____
Replacement Cost on Building	_____
Peril Coverage on Contents	_____
Replacement Cost Coverage on Contents	_____
Contents Coverage for Non Owner Resident Host	_____
Appurtenant Structure Coverage Business Related	_____
Personal Property of Guests	_____
Antiques and Fine Arts Coverage	_____
Credit Card Coverage	_____
Loss of Rental Income	_____

Be sure to discuss your needs with several insurance companies which offer special coverage. Do some comparative shopping, but remember that the least expensive source might not be the best insurance. **Seek out companies that have special B&B packages.**

## G. Planning for taxes

Taxes for home businesses can be extremely complicated. Be sure to have a **professional accountant who is familiar with home-based businesses** assist you in understanding your legal obligations and developing a tax plan that best suits your operation.





## H. Meeting local requirements

Early in your planning process review your local zoning, fire safety, and health regulations. Many of these requirements are set at the local level. It is important to contact the municipal planning and building departments in your area and to inquire about business license and operating permit requirements.

**Zoning** problems in rural areas are unlikely. At the local or municipal level, there is a wide diversity in zoning ordinances from town to town. If you perceive any difficulties, work with zoning administrators and assist them in understanding the type of business that you propose. It is a good idea to provide them with B&B zoning guidelines from other towns as examples. Zoning review boards consider the beneficial or negative impacts a B&B might have on the local area. They are concerned about keeping the neighborhood values. Visual impacts, and changes in traffic and parking will be considered by the board. If it is necessary to obtain a zoning change be sure to discuss your plans with neighbors and be considerate of any associated concerns they may have. Remember that obtaining a zoning variance will take time and involve a public meeting. The assistance of an attorney may be required.

**Health regulations** vary greatly from area to area, and it is quite likely that you will have to meet state and local regulations. You will have to meet requirements pertaining to water quality, sewage disposal, food storage and handling. Early in your planning process meet with your health officials and become familiar with the legal requirements. Have your health officials make a preliminary examination of your home and discuss any changes in facilities or planned operations that may be required.

**Fire Safety** is another item that requires the understanding of state and local codes. In many areas the building codes cover fire safety. Your B&B should have **smoke alarms, marked exits, and visible fire extinguishers**. Local regulations may also require fire doors, additional exits, and storage areas for flammable materials. Be sure to thoroughly review your requirements with the local officials.



Two Suns Inn Bed & Breakfast, Beaufort, SC  
<http://bnblist.com/sc/twosuns/>



Liberty Hall Inn Bed & Breakfast  
Pendleton, SC

<http://www.usagetaways.com/sc/liberty/>



Two Suns Inn Bed & Breakfast, Beaufort, SC

<http://bnblist.com/sc/twosuns/>

### III. ADMINISTRATION:

## Developing Policies and Procedures

Prior to accepting your first reservation, it is important to develop basic **operating and administrative policies and procedures**.

### A. Reservation Requests

Reservation requests usually will be made by telephone or through the mail. Experience has shown that most individuals who call for reservations expect to get through on the first or second attempt and few will continue trying.

Restrict family use of your reservation telephone line. It may be worthwhile to install an additional telephone for family and personal needs. Consider the purchase of a telephone answering machine to cover for you during your absence. The best solution to the problem is to ensure that telephone lines are kept open and that someone is available to provide information and take reservations.

### B. Handling Reservations

#### RESERVATION REQUESTS SHOULD BE ANSWERED IMMEDIATELY

All inquiries for reservations should be handled in a professional manner. A map indicating your location should always be enclosed with your confirmation. You may include information about events, attractions and tourist facilities in the area. Your local Chamber of Commerce and/or South Carolina Travel Information Centers (list in Appendix) can supply this information. (Copies of these forms may be found in the Appendix.)

- **Telephone Reservation Request:**

This form outlines the type of information that you require from anyone wishing to make a reservation over the telephone. Advise callers that reservations will be confirmed after you receive their deposit. Set a date by which the deposit has to be in your hands (i.e. within 14 days).

- **Deposit Receipt/Reservation Confirmation:**

Once you receive the deposit, prepare a confirmation and forward it to the guest. Keep a copy for your records. Ensure the deposit/cancellation/refund policy is clear on this form. Staple your copy to the original reservation request form.

- **Tracking Reservations:**

Enter all reservations in a date book or calendar page such as outlined in the Appendix.

Where more than one room is available, divide your calendar into the desired number of spaces and indicate the type of bedding available in each room.

Once a host has committed a room, the visitor's name is entered in pencil in the appropriate space. When you receive a deposit the guest's name may be entered in ink, or the letter "D" for "Deposit" placed in the space.

A one-page/month calendar enables the host to see, at a glance, what reservations are expected.

## **C. Deposit/Cancellation/Refund Policy**

It is standard policy to request a one-night's deposit at the time reservations are made, if possible. A credit card number can be given over the phone for a deposit if you accept credit cards. Confirmation is mailed only upon receipt of the deposit.

Have a policy related to refunding in cases where cancellations are made. Most hotels and motels will refund deposits if cancellations are received up to 48 hours prior to arrival date. In determining your policy, bear in mind that your ability to re-rent cancelled accommodation decreases as you get closer to that date.

Ensure that your policy is understood by all guests by clearly outlining it on your registration confirmation form. An example of a refund policy is outlined on the confirmation form included in the Appendix.

## **D. Handling Long Distance Calls**

Charges for long distance calls are normally paid by the caller. Remember however, responses to messages will result in charges to you, the host. With this in mind, you may want to advise callers that messages will be returned on a "collect call" basis. (Unless they are trying to make a reservation.)

## **E. Office Equipment and Supplies**

Keep a supply of stationery items, such as receipt books and postage stamps on hand. Consider purchasing a typewriter or personal computer to give your correspondence a professional look. A personal computer will go a long way to assist you in keeping records.

## F. Bookkeeping/Accounting

The best time to set up a record-keeping system is before you start the business. **Experience clearly indicates that the use of an adequate record-keeping system increases the chances of business survival.** Too often, those entering a business think they must keep records only because it is required by the Internal Revenue Service. However, accurate and complete financial records can help the owner monitor the business and make plans for the future based on financial knowledge rather than guesswork.

Contact an accountant who is familiar with home-based businesses, and develop a simple accounting procedure which will make year-end calculations easy. Additional bookkeeping information may be obtained by contacting your local Clemson Extension service or technical college.

## G. Setting House Rules

Every business that operates smoothly runs with guidelines. It is important to your guests to know what is acceptable to you. It would be to everyone's advantage to have your guidelines available to answer any questions they may have. Making the list will also clarify the boundaries to yourself

When determining your house rules and regulations, keep in mind that your guests may be overwhelmed by a lengthy list. Focus on the rules that you feel are most important for a well run business. State your rules in a positive manner. A long list of negative rules is a turn-off to customers. Post your policies in the rooms and at the front desk; they will be respected if you make them clear. Important or unusual items should be mentioned in your advertising and reservation material.

### Items To consider When Developing House Rules:

- Pets
- Children
- Smoking
- Alcohol
- Check in/check out times
- Keys
- Breakfast hours
- Kitchen privileges
- Housekeeping
- Visitor
- Telephone usage
- Laundry facilities
- Tourist information
- Credit cards/personal checks
- Reservations/cancellations
- Deposits or advanced payment
- Provisions for handicapped guests
- Equipment rentals
- Use of house and ground areas
- Emergencies





Beauguard House, Charleston SC  
<http://www.charlestonbedbreakfast.com/>



## IV. OPERATION: Developing an Operations Plan

To develop an operation plan, you should begin by deciding the following:

- The activities to be carried out in the operation of the business.
- Who will carry out these activities. (This decision is very important. Couples and families should work out who will do what in advance.)
- What talents are necessary to make the business operate smoothly.
- How any inadequacies will be handled.
- The objectives for the major activities, and the policies and procedures for reaching them.

In a small B&B business you are both manager and employee. As manager, you plan, implement, direct policies and procedures, and evaluate the effectiveness of the business operation. However, as employee, you are also responsible for carrying out the following activities involved in running the B&B business:

- **Front Desk Operation:** Taking reservations, registering guests, receiving payment and handling complaints.
- **Housekeeping:** Cleaning procedures and schedules for rooms and public areas, cleaning materials, room furnishings, guest supplies, laundry supplies and facilities, and contract cleaning.
- **Food Preparation and Service:** Menu, food preparation and storage, kitchen supply inventory, service location, meal hours, dishwashing equipment, sanitation policies and health regulations.
- **Selling Your Area:** Promoting area attractions for the entertainment of your guests.
- **Extras:** Guest relations and amenities.

## A. Front Desk Operation

Ensure that everything is ready for the arrival of guests.

Take the time to welcome your guests upon their arrival. Enquire about your brochure and other information to get feedback as to whether it was helpful. Escort your guests to their bedroom, and provide assistance with their luggage.

Invite your guests into your living room following their “settling-in period,” and offer them a complimentary beverage such as coffee or tea. This casual meeting will allow you to:

- Answer any questions regarding directions, attractions, events, etc. in your area.
- Discuss breakfast hours. If you provide a choice of breakfast items, this will be a good time to ask your guests what they prefer.
- Discuss house rules (smoking, parking, etc.)
- Find out about your guests’ plans. Knowing their plans will allow you to plan your own time. Make suggestions about what to see. (Literature, maps, and brochures about your area should be readily available for them to browse through at their leisure. These are available from your local Chamber of Commerce, Parks, Recreation and Tourism, or Regional Tourism office. See Appendix for addresses.) Always have someone available while your guests are in your home.
- Explain your key policy. Provide a key to the front door to the guests for the duration of their stay. This allows freedom of, movement at minimum inconvenience.
- Register your guest. For the protection of the host, all guests should register upon arrival. Registration should include name and address of party, car license number, and dates of stay. A simple guest register can be a guest book like those commonly used at social functions. These books are available at most card or gift stores.

## B. Housekeeping

Standard housekeeping procedures should be followed in cleaning bedrooms and making-up beds.

Fresh bedding and linens should always be provided after guest checkout or every few days if the guests’ stay is for an extended period. Basic housekeeping should always be provided daily.

### Making the Bed:

- Strip and shake-out all bed linens to ensure no valuables are left behind by guests.
- Replace mattress pad if badly soiled or stained.
- Spread bottom sheet over pad and smooth it out, tucking both sides under mattress. If fitted sheets are not being used, allow bottom of the sheet to hang free over the foot of the bed.

- Spread top sheet, making sure it is centered and that you will have at least 8 inches to overlap blankets at head.
- Tuck sheet and blankets together under mattress at foot of bed only, making neat “hospital” corners and leave the sides to hang. (Do not tuck top sheet under mattress at sides because the bottom sheet will come loose when the guest pulls down the top sheet and blanket to get into bed.)
- Replace pillow cases, place pillow on bed with open ends toward the outside.
- Cover bed with a clean bedspread or comforter, which should hang evenly around the bed.

### **Dusting:**

Dust build-up can become a serious problem. Dust all woodwork and furniture, picture frames, window sills, clothes rack and shelving, heating/air conditioning units, vents, and other furnishings.

### **Vacuuming:**

Vacuum all carpeted areas. Hardwood floors should be dry-mopped.

### **Furnishings:**

- Wash all ashtrays
- Empty waste basket
- Discard disposable items
- Replenish glasses
- Replace burned-out light bulbs
- Arrange any literature/stationery supplied in drawers
- Adjust curtains/drapes
- Check for proper mechanical function of all items provided
- Replace all used towelings.

**Extending Mattress Life:** To ensure a longer mattress life, turn mattresses over two to three times per year.

**Personal Belongings Left Behind:** In order to ensure that no personal belongings were left behind by departing guests, CHECK: Under beds, inside all drawers, backside, of washroom door, and bathroom cabinets. Make arrangements to return all such items to the guest.

**One Last Look:** After room is cleaned, stand at the door a second, and take a good look around. Correct any discrepancies. Deodorize each room.

### **Cleaning The Bathroom:**

It is important from the health standpoint that bathrooms are kept clean and sanitary at all times. Due to humidity, unsanitary bathrooms quickly become a breeding ground for germs and other harmful bacteria. The following cleaning procedures should be followed on a regular basis:

- The toilet bowl should shine clean with absolutely no sign of staining. Place small amounts of bowl cleaner on swab and clean inside of bowl, let the cleaner stay on for awhile-before flushing, wipe outside of bowl with clean sanitized cloth.

- Sanitize toilet seat, check to ensure that it is not loose-if so, tighten bolts.
- Bathtubs/showers, washbasins and tiles should be cleaned and wiped dry with a sanitized cloth. All chrome should be polished.
- Check and wipe dry inside shower curtain to remove any buildup of soap and stains.
- Clean and polish mirrors, vanity top and under rim of washbasin.
- Arrange clean towels, washcloths, bath mat and soap.
- Check and refill facial tissue and toilet tissue dispensers.
- Mop bathroom floor.

## C. Food Preparation And Service

The objective of developing a food plan is to provide the guest with a memorable culinary experience. A number of factors can add considerably to the guest's enjoyment of the breakfast, such as a pleasant dining atmosphere, attractive food presentation, stimulating conversation, and a unique regional menu.

Always remember that a basic rule in food preparation is to serve hot foods HOT and cold foods COLD. It is also imperative that the kitchen area, the utensils, and the person preparing and serving the food be clean and sanitary.

State and local health regulations will restrict the kinds of food you may serve. Due to the lack of elaborate food preparation facilities, many B&Bs are limited to serving a CONTINENTAL breakfast, which normally includes rolls, fruit, coffee, and juice. However, you can make a continental breakfast distinctive by offering high quality pastry and fresh fruit that are attractively garnished and presented.

In addition to serving breakfast, it is good to have coffee, tea, soft drinks, sherry or wine available to guests when they arrive or throughout the evening. Furthermore, a homemade cake or cookies are greatly appreciated.

### Preparing Breakfast:

Be creative in the planning and development of breakfast menus. Croissants, muffins, and bread rolls can be varied and specialized. A variety of home baked goods, and homemade preserves also provide a nice touch. Garnish the plate with slices of fresh fruit to provide color and fill the plate. It is better to charge a little more and provide a quality breakfast, than to skimp and disappoint your guests. A variety of breakfast menus and ideas may be found in cookbooks. Some are specifically developed for small country inns and B&B operations. Browse through a bookstore or library to obtain new ideas.

### Serving Breakfast:

Take care to create a pleasant breakfast environment for your guests:

- The table should be set with a nice cloth and napkins, and your best china and flatware. Freshly-cut flowers from your garden and crystal glasses for juice provide an elegant touch to any morning meal.



- Serve breakfast in the dining room, not in the kitchen.
- Unless invited by the guests, neither the host nor his/her family should eat with the guests. It is acceptable to join guests for coffee or tea once the meal is concluded.
- When more than one group of guests share the breakfast table, the host should take the time to introduce everyone.
- Breakfast may be served by preparing individual portions for each guest or by letting the guests serve themselves, country style, from dishes centrally placed on the table. You may choose to serve buffet style from a separate table or buffet.
- Ample coffee and tea should always be available.

### **Breakfast in Bed:**

You may choose to provide the option of breakfast in bed to guests celebrating special occasions. (Consider that accidents will occur and permanent food stains may result to comforters, blankets, or carpets.)

## **D. Selling Your Area**

When guests come to your property to stay they may depend on your expertise in determining what they should do for entertainment. As a service to your guests it is important to be aware of all of the different opportunities available in your area. You should make yourself an ambassador for the area. Not only should you be aware of the attractions in your particular town, but within a radius of about 30 miles, as well. Local museums, historic homes, theme parks, zoos, restaurants, state parks, theatres, tours, parks, shopping opportunities, night clubs, hiking trails, tennis, golf, birdwatching, photographic opportunities, anything special in the area should be compiled on a list of “Things To Do” for your guests. Your local Chamber of Commerce, SC Parks, Recreation and Tourism or Regional Tourism Organization are all good resources for information.

Be sure to keep abreast of events and festivals that could be attended. Keep a supply of MAPS and brochures on hand to give to your guests to assist them in planning their activities. Some properties have bicycles available. You may consider assisting your guests in making reservations at restaurants or other attractions.

## **E. Extras**

A word about **SERVICE**: Most of your guests select a Bed and Breakfast or Inn over a standard hotel or motel because they are searching for “something more than the same old thing.” The extras that you provide to enhance their visit are limited only to your imagination. Here are only a few ideas that you may choose to incorporate:

### **SOME “SECRETS” OF GREAT GUEST RELATIONS**

- Greet each visitor with a SMILE!!! 😊
- Present a clean and neat appearance.

- Be attentive and friendly, listen carefully to what visitors say.
- Think of the visitor as a **welcome guest**. Treat them as you would want to be treated.
- Don't be "right," be polite.
- Make a friend.
- Speak of your community with pride. Never be negative.
- Anticipate the needs of your guests and have materials and information on hand.
- Collect menus from popular restaurants to have available.
- Provide a list of churches in the area along with worship service hours.
- If yours is a historic home, guests may be interested in its history and architecture. Keep a write-up handy for them to read.
- Provide a copy of public transportation schedules.
- Provide turn-down service in the evenings, with a candy on the Pillow.
- Follow up visit with personal note, invite them back.

**Amenities** create a sense of luxury, build the image of your B&B, and encourage favorable word-of-mouth advertising. Consider the full range of amenities listed below in relation to the projected image and cost of your B&B.

Adapters	Cotton balls
Aftershave	Courier service
Air freshener	Curling iron
Airport transportation	Departing gift
Antique furnishings	Deodorant
Art gallery	Drinking glasses
Baby strollers	Drinks (complimentary champagne, wine, sherry, coffee, tea, sodas)
Babysitting service	Extension cords
Baggage storage	FAX
Bar	First-aid supplies
Bath salts, bubbles	Flowers
Bathrobes	Fruit basket
Beach towels	Gardens, trails, woodlands
Bicycles, mopeds	Hair conditioner
Boat charters	Hairdryer
Books, library	Hand cream
Brochures	Hobby displays/collections
Candy dish	Homemade items/meals
Card tables	

Cheese tray  
Children's games  
Chocolates  
Clothes brush  
Cologne  
Comforter  
Computers, word-processors  
(in room)  
Corkscrew  
Letter openers  
Limousine service  
Lint removers  
Luggage tags  
Lunch/dinner  
Maps  
Membership in club/fitness center  
Message-taking service  
Mineral water  
Mints/candy on pillow  
Mouthwash  
Nail polish remover  
Newspapers  
Piano  
Pens  
Photocopying  
Picnic basket  
Pillows (extra)  
Playing cards  
Radio  
Raincoat  
Reading material  
Restaurant discounts  
Sachet/potpourri in drawers  
Safe for valuables  
Safety pins  
Secretarial services  
Sewing kits

Hors d'oeuvres  
Hot tub/sauna  
Ice bucket in room  
Insect repellent  
Interpreter  
Iron, ironing board  
Kitchen privileges  
Laundry privileges/service  
Laundry soap, bags  
Shampoo  
Shaving cream  
Shoehorns  
Shoe polish, mitts  
Shoeshine service  
Shopping discounts, gift certificates  
Shower cap  
Sightseeing tours  
Skirt hangers  
Slippers  
Soap  
Special rooms-music, billiard  
Sports equipment  
Spot remover  
Stamps/stationery  
Sunscreen  
Swimming pool  
Tee time reservations for nearby golf  
Television/VCR  
Telex  
Tickets to events  
Toothbrush  
Toothpaste  
Tourist information packets  
Towels (large)  
Typewriters  
Umbrellas  
Wheelchairs





## V. PROMOTION: Developing A Marketing Plan

Serendipity Inn, Myrtle Beach, SC  
<http://www.serendipityinn.com/index.htm>

**Marketing** is simply a way to inform people about what you have to offer, thereby encouraging them to visit your B&B. Always remember “**MARKETING IS MORE THAN ADVERTISING!**”

The success or failure of many businesses is often linked to the operator’s promotional (marketing) effort. Give careful consideration to the development and implementation of a promotional strategy which is realistic in terms of cost, time availability, and overall attainability.

To be successful you must know your market. Thinking that your product will sell itself is the most common marketing misconception of new entrepreneurs.

The key elements in marketing are: **product design, identifying the market, promotion and advertising.**

### PRODUCT DESIGN

A product can be a physical object or a service, such as a Bed & Breakfast. You must be committed to producing and providing a **quality** product or service as discussed in the Development, Administration and Operation chapters.

### IDENTIFYING THE MARKET

After you have planned your product you should know **to whom you are trying to sell.** Is your market individuals, retired couples, business travelers, groups, vacationers, honeymooners? You will also want to determine the income level, location and any other specific characteristics of your potential customers. This will determine how you advertise, where you advertise, and also whether the product is likely to be successful or whether you need to change it.

The customers’ needs, wants, and wishes are very important to the entrepreneur who wants to be successful in the marketplace. Market research has shown that the price tag is NOT the first thing customers notice. First, customers note the product, its general appeal, and their desire to use it. Then they ask the price.

After you have done your market research, you should have a fairly good idea of whether or not your business will succeed. Your research also tells you where and how to promote your product.

Marketing is a **continuous** process that should not be neglected once you have launched your business. If your product is not selling, consider changing the product, the price, the services or special features you offer, the name of your product, your target customers, or your advertising methods. Remember, **flexibility** can keep you in business when your competitors fail.

## PROMOTION AND ADVERTISING

Few products on the market appeal to everyone. Your financial success depends on your appeal to enough customers to cover your expenses and a profit percentage. Establishing your business requires a certain amount of assertive personal selling. **If the public does not know that your facility exists, there will be little demand for it.** Creating public awareness and demand for your product involves commitment to a promotional strategy, and some hard work, especially in the initial years. Careful thought should be given to the development of a descriptive promotional brochure, and the implementation of a marketing strategy which is realistic and cost-effective.

### A. Brochure Development

A brochure advertising your operation will be THE MOST IMPORTANT PROMOTIONAL ITEM you can use to build awareness of your bed and breakfast operation. It does not need to be expensive if you keep it simple. Select images and words that will represent your B&B in an accurate and inviting manner. Obtain as many brochures as possible from other bed and breakfast operators, particularly those nearby. Study them carefully and see which appeal to you.

The brochure that you develop should be as informative as possible, without appearing cluttered and distracting. As your major selling tool, the brochure should contain all the information about your facility that a guest requires in order to make an informed decision to stay with you.

As a general rule, the basic brochure should contain:

- Address of facility and names of hosts
- Details about facilities and rates
- Reservation procedure (credit cards accepted)
- List of attractions nearby
- Map of your location
- Addresses of Visitors' Bureaus or Chambers of Commerce (where more information may be obtained about attractions in your area)



The brochure can be distributed locally to hospitals, nursing homes, area chambers of commerce, restaurants, area convention and visitor's bureaus, regional tourism offices, PRT Travel Information Centers, and airports. (See Appendix for list of addresses.) For wider exposure, consider distributing the brochure to B&Bs in adjacent counties and states. It is also the most important piece that you would use in any direct mailing campaign.

## B. Public Relations and Personal Selling Program

Building strong credibility within the community will also help promote your B&B. Many guests are referred by people living in your area. Local residents and businesses like to recommend places that are an asset or a unique feature of the community. **If they believe you are well prepared to offer a pleasant experience, they will recommend you.** Your community public relations and personal selling program may include the following:

- Make local residents aware that you are offering bed and breakfast. This can be an excellent source of referral business, particularly in smaller communities.
- Support community programs. Become a member of the chamber of commerce, better business bureau, local merchant association and the nearest convention and visitors bureau. Volunteer to give presentations on the B&B business at local clubs and community gatherings. Learn if you can advertise in annual or seasonal mailings. **Request permission to display your brochures.** Become active in civic and community groups and offer your B&B as a meeting place to build rapport and cooperation.
- Work with community, regional and state support groups to develop tourism. Help develop promotional literature on the history, seasonal events, and unique features of your community. Be sure to contact the Regional Tourism Organization in your area and the South Carolina Division of Tourism. The S.C. Division of Tourism produces a statewide brochure listing B&Bs in the state, so be sure that you are listed in the latest publication.
- Work with the PRT Travel Information Centers: Please be sure that each Travel Information Center has a good supply of your brochures. Contact the central office for approval of your brochure and they will advise you on distribution to the centers. (A complete list of these centers is included in the Appendix.) Each center is capable of making reservations for you. Many reservations are made through their “discount coupon” program. This program is offered to travelers requesting assistance with reservations, offering them a discounted rate in properties across the state who participate by offering discounts to be used through the centers. The coupons are featured on a board at each center and the staff makes reservations for the traveler after they have made a selection. This is offered as a FREE service to you and at no charge to the traveler. It is important that the Travel Information Center staff is also familiar with your property. YOU should visit each center, introduce yourself, take them a supply of brochures and invite each staff member to come for a COMPLIMENTARY stay at your B&B.
- PRT FAMS: Contact PRT to advise them that you are willing to participate in FAMS (familiarization tours) that they may be planning in your area. Providing complimentary lunch, room inspections, personal contact, printed information to FAM. participants would be a good marketing investment. Follow up with a letter to each participant telling them that you are glad that they came and that YOU WANT THEIR BUSINESS.
- **Market your B&B through the local press.** Send regular news releases to area newspapers and radio and television stations. Give guest TV and radio appearances describing the amenities of your B&B. Consider hiring a freelance writer to develop articles for submission to regional newspapers. The S.C. Division of Tourism, Communications Services, can assist you in this

endeavor. Some newspapers have a weekly calendar and tourism section that lists the area's lodging accommodations. Finally, develop a press kit including: a black and white photograph, a brief history, and a description of your B&B to give to newspaper reporters and freelance writers. Some regional and local papers may wish to do a human interest feature about your facility which will provide free local publicity.

- Visit large companies, manufacturing plants, regional offices in your area to personally meet the executives. Make them aware that you are in business and can provide quality accommodations for incoming executives. Identify key executive secretaries who are responsible for **making reservations** for business travelers. Establish a program for key secretaries, offering a bonus program as an incentive for bookings. Keep in constant touch with these contacts, they are your best bet for weekday, repeat business.
- Entertain the key secretaries at a special dinner or drop-in to acquaint them with your property.
- Send out a special Christmas gift or card to the key secretaries with an invitation to spend the night to see what the property offers to the business traveler. This enables the secretaries to recommend a familiar property.
- Cooperate with area businesses. Make personal sales calls on businesspeople, especially restaurant managers, plant managers, personnel directors, stores, purchasing agents, real estate salespeople, gas stations and convenience stores. Follow up each visit with a personal letter. See if they will stock your brochures, as well. Local word-of-mouth referrals are a very solid way to attract guests at little or no cost.
- Contact private citizens and community leaders. Read the local newspaper carefully and make personal calls to local people holding family reunions, weddings, confirmations, bar mitzvahs, and other events where out-of-town guests may be involved. Send out letters of congratulation concerning awards, promotions, and accomplishments to keep your business profile high among community leaders.
- Participate in Community Events. Keep abreast of activities and events in the community, particularly where these activities generate visitor traffic. For example, if an annual sporting event takes place in the community, contact the organizers and request that your facility be listed in their promotional literature as an alternate accommodation.
- Answer inquiries promptly. People who make inquiries are your most promising potential customers. Such inquiries should be answered **promptly**, and with the information requested. You should make it easy for those who inquire to make a reservation by including a phone number they can call collect or a self-addressed, stamped reservation form.



## C. Special Promotions

- Consider offering holiday and weekend packages that include activities such as hiking tours, biking, theatre tickets, fishing, golfing or historic tours. During the off season, advertise special rates in newsletters, newspapers, and regional magazines for families and senior citizens, and offer family and friend promotions to regular clients. Special events and package deals such as these will create interest and generate publicity for your B&B.
- Try to plan special events for each season of the year and encourage local merchants to co-sponsor and promote the events. Nonprofit sponsorship may entitle you to free public service announcements on radio and television.
- Consider donating a free night at your B&B as a prize at fund-raising events.

## D. Newsletters

An important tool for reminding former guests about your B&B and generating repeat business is the newsletter. Ideally, a newsletter will contain information on the accommodations offered by your B&B, a history of the home, promotional events and package deals, special community attractions, and announcements of improvements or additions to the B&B. You might also consider sending out Christmas cards and other appropriate seasonal greetings to past guests.

## E. Business Cards and Other Promotional Items

Incorporating the name and logo of your B&B on business cards, fact sheets, stationery, and policy sheets is a relatively inexpensive promotional tool. Professional business cards can help establish credibility, while attractive, well written fact sheets can gain exposure and promote the image you have created. Fact sheets can be placed on bulletin boards, handed out to guests, included in mailings, and sent to other B&Bs in your region. Policy sheets posted in each room will outline the rules of your establishment while reminding guests of your business's name and logo. Also consider incorporating the name and logo on in-house items such as informational posters, placemats, and stationery and on complimentary gifts such as matchbooks, pens, and postcards. Making your name and logo as visible as possible will make guests more likely to remember your particular B&B.

## F. Listing the Yellow Pages

If you have a business phone number you are entitled to one free listing in the yellow pages. Because B&Bs are still a relatively uncommon form of lodging, your listing may be most visible in the motel section. The majority of people who consult the yellow pages are passing through town and calling at the last minute to find a place to stay.

## G. Advertising

- **Print advertising** can be a very effective medium in creating awareness among buyers. (Remember that advertising is only one of the tools at your disposal. In order to be effective, it should be used in support of other promotional efforts and not stand alone.)



Note that one or two well-placed ads may be more effective than a multitude of scattered ads in a variety of publications. Consideration should be given to advertising in publications which a visitor to the area would consider while looking for overnight accommodations.

When placing a large advertisement give a brief history and description of your B&B in regional newspapers of your major market. Then follow up with a series of smaller reminder ads. You might also evaluate the cost effectiveness of placing small and frequent ads in the classified section under “Bed and Breakfasts” and in the travel sections of regional magazines. Consider purchasing advertising space in local chamber of commerce brochures and specialty publications on local activities such as golfing and hunting. When buying ad space, compare prices based on cost and circulation.

Another consideration is to contact the South Carolina Division of Tourism for its ad campaign schedule and consider advertising where they have selected to advertise the state. This is called “piggy-back advertising.” It compounds the effect of your advertising dollar, gives you greater exposure and could give you a price break by being part of a South Carolina section in a publication.

- **Listing In Guidebooks:** Listing your B&B in guidebooks is a relatively **simple and inexpensive** way to attract guests, particularly distant customers. The cost ranges from \$15 to \$60 per guidebook. (Some are FREE.) To decide which books you would like to be listed in, browse through the travel section of a bookstore. (See Appendix for a listing of B&B guidebooks.) Ask other B&B operators which ones have proven to be the most effective for them. Select a reasonable number of guidebooks that look attractive and compare them based on the following factors:

- Cost
- Circulation volume
- Market
- Updating frequency
- Membership requirements
- Type of B&B descriptions
- Exclusivity stipulations
- Certain standards that must be met
- Inspection policies



You may also want to inquire about liability and group life insurance policies available to members. Also ask about newsletters and other benefits. Because it may be one to two years before a new or updated guidebook reaches the bookstores, contact the guidebook’s writers before you open.

- **Broadcast Advertising.** Broadcast advertising usually is a more expensive form of advertising. Television and radio are seldom used by a B&B, however, you might consider using it to announce your opening and to promote your B&B early in the busy season. Select a station that more or less shares your target market segment. For radio promotion to be effective, listeners should hear the name of your B&B several times a day during a period of a week. Seek professional advice in writing copy and choosing background music so that you project the image you want.

## **H. Listing with a Reservation Service Organization (RSO)**

B&B Reservation Service Organizations maintain and publish listings of B&Bs in various locations that travelers may consult when deciding on lodging. The B&B host pays a listing fee of anywhere from \$5 to \$200. **RSOs do charge a commission**, usually twenty percent of the guest’s lodging fee. The commission

is charged for repeat guests as well. In exchange for the fees and commission the RSO screens guests, handles deposits, and provides some publicity. Most arrangements between B&B hosts and an RSO are clearly described in the form of a signed contract. Some RSOs require that your B&B conform to certain standards.

There are many B&B reservations organizations to choose from, so you will want to shop around in selecting the RSO that best suits your needs. (You can obtain a current listing of RSOs from: The American Bed and Breakfast Association, P.O. Box 23486, Washington, D.C. 20008.)

## I. Travel Agents

(Remember that travel agents are **professionals who are paid a commission** per room night that they book in your property.)

Target travel agencies in nearby large cities for a sales blitz. (Charlotte and Atlanta, for example) Get a phone book from the targeted cities or contact their state tourism offices and request a listing of the travel agencies in their state. Consider a direct mail piece to all agencies offering them a free night stay per travel agency. This will give you an opportunity to have them familiar with your property and better sell the area as a destination. Send travel agents information on the area as well as a cover letter. Consider offering a travel agent's discount to any other agents from their agency who wish to come. They may not recommend your property if they are not familiar with it. (This could be done in the form of a postcard with a picture of your property on the front, if you want to watch costs.)



The Ashley Inn Bed & Breakfast  
Charleston, SC

<http://www.Charleston-sc-inns.com/>

## J. Group Tours

(NOTE: Marketing to attract groups should only be attempted by inns with at least twenty-four rooms.)

South Carolina PRT maintains the names of group tour operators who are presently coming to or through South Carolina if you decide to do a **direct mail** piece.

### **Include:**

- a cover letter inviting the tour operator for a COMPLIMENTARY night's stay to "experience" your property and see your area.
- a brochure on your area as well as the brochure and fact sheet of your property.
- The most important information you need to include are one-night and two-night packages which they could offer to their clients. This should include a suggested itinerary, PRICES, (including tax and gratuities) and booking procedures. The price should be a NET price as most tour operators add a commission.

Generally, tour operators will RARELY bring a group somewhere that they have not personally stayed before ... they have to sell their own programs and answer the questions of their travelers. PERSONAL calls need to follow-up each possible lead. just sending them a brochure WILL NOT sell your property! They HAVE to have the packages.

Contact the South Carolina Division of Tourism's Group Tour Marketing Division (803/ 734-0128) and ask to receive their contact lists from the National Tour Association, American Bus Association and Travel South Market Places. These are lists of tour operators that they have met with who have expressed an interest in bringing group tours into the state. These tour operators should receive the information described above from you as well.



[The Cannonboro, Charleston, SC](#)



## VI. APPENDIX

### Bed and Breakfast guidebooks:

The Schell Haus Bed & Breakfast  
Pickens, SC

<http://www.bbonline.com/sc/schellhaus/>

Following is a partial list of guidebooks that you may choose to contact for listing your property. This is by no means a complete list. Browse in your local bookstore to find names of others and to get an idea of what they are like. Most of the costs range from \$0 to \$50, according to their circulation. Each have different publishing dates, and **their copy deadline is usually six months prior to their publishing deadline. CONTACT THEM EARLY!**

*Bed and Breakfast USA: A Guide to Tourist Homes and Guest Houses*, Betty Rundback and Nancy Ackerman, \$10.95, 725 pages, illustrated, Sandy Soule, Editor, E.P. Dutton, 2 Park Avenue, New York, NY 10016 (212/725-1818) Contains listings in all 50 states, plus Canada. A chapter on how to start your own B&B is included as well as sixteen pages of mouth-watering recipes from B&Bs around the U.S.

*The Official Bed & Breakfast Guide, For the US and Canada*, Phyllis Featherston and Barbara Ostler, \$13.95, illustrated, 148 East Rocks Road, P.O. Box 332, Norwalk, CT 06852 (203/847-6196).

*Country Inns and Back Roads*, Jerry Levitin, (formerly Norman T. Simpson) illustrated, 80 pages, \$4.95 Harper and Rowe Publishers, 10 East 53rd Street, New York, NY 10022 (707/255-2211).

*Bed & Breakfast American Style*, Jerry Levitin, (formerly Norman T. Simpson) Harper and Rowe Publishers, 10 East 53rd Street, New York, NY 10022 (707/255-2211).

*Complete Guide to Bed & Breakfasts, Inns & Guesthouses*, Pamela Lanier, John Muir Publications, Santa Fe, NM 87504.

*Bed And Breakfast North America*, Norma Buzan, Betsy Ross Publications, 3057 Betsy Ross Drive, Bloomfield Hills, MI 48013 (313/646-5357). Guidebook of B&Bs featuring specialty recipes from each. You may get some good ideas for breakfasts!

## **Additional books that may be useful to you:**

*How To Open A Country Inn*, Karen L. Etsell. The Berkshire Traveler Press. Stockbridge, Massachusetts 01262.

*Start Your Own Bed & Breakfast Business-Earn Cash From Your Extra Room*, Beverly Mathews, \$5.95, 1.80 pages, Pocket Books, 1230 Avenue of the Americas, New York, NY 10020.

*So You Want To Be An Innkeeper*, Mary Davies, Pat Hardy, JoAnn Bell and Susan Brown. 101 Productions of San Francisco, 228 pages, order from Inn Review, PO Box 1789, Kankakee, IL 60901.

*How to Start Your Own Bed & Breakfast*, Mary Zandec. Golden Hill Press, Box 122, Spencetown, New York 12165.

*How to Open and Operate a Bed & Breakfast Home*, Jan Stankus. 290 pgs, Globe Pequot Press, \$12.50.

*Open Your Own Bed & Breakfast*, Barbara Notarius and Gail Brewer, 230 pgs, John Wiley and Sons, Business Law/General Books Division, 605 Third Ave, New York, NY 10520.

*Innkeeping Supplies and More Innkeeping Supplies, New Sources & Resources*, Beverly Mathews, \$5.00 Rocky Point Press, PO Box 602, Santa Monica, California 90406. These two booklets feature information about products for inns.

*How to Make Money at Innkeeping*, Michael Vincent Kuntz, Southern Hospitality Concept, Inc., 142-02 Eighty-fourth Drive, Briarwood, NY 11435. Details budgeting, housekeeping, front desk, food and restaurant departments, etc. for medium to large-sized operations.

*Guest Services-500 Ideas*, Innkeeping World, P.O. Box 84108, Seattle, WA 98124. Creative ideas from the "big guys" in the hotel industry. Unique services and amenities, adaptable to inns.

*Secrets of Entertaining from America's Best Innkeepers*, Gail Greco, Globe Pequot Press, \$12.95. Contains wonderful tips on a variety of subjects. Efficient ways and time-saving ideas on how to clean house. Example: Glassware clouded by mineral buildup will come clean when soaked in a half gallon of water combined with a few denture-cleaning tablets!

## **Associations:**

**The American Bed & Breakfast Association**, 16 Village Green, Suite 203, Crofton, MD 21114 (301/261-0180) Membership of \$150.00, newsletter, guidebook published, also other publications and information for members.

**Association of Professional Innkeepers, International**, JoAnn M. Bell, Executive Director, P.O. Box 90710, Santa Barbara, California 93190 (805/965-0707) Membership offers: newsletter, workshops, technical assistance, index of members.

## Resources:

“Innkeepers Guide To Travel Editors,” Beverly Mathews, \$7.50, Rocky Point Press, PO Box 602, Santa Monica, California 90406. Contains an updated, current list of travel editors of hundreds of publications. A valuable resource for creating free publicity.

## South Carolina Tourism Regions:

For tourism promotional purposes the state of South Carolina has been divided into ten tourism regions. Each tourism region is named and comprised of several counties. The tourism regions are:

**Olde English District:** Chester, Chesterfield, Fairfield, Kershaw, Lancaster, Union and York counties. This region is located in the mid-northern border of the state. The area offers more than 25 festivals and special events, over 50 historic attractions, eight state parks, a dozen golf courses and more than 32,000 acres of lake surfaces. Contact: Olde English District Tourism Commission, P.O. Box 1440, Chester, SC 29706, (803/385-6800).

**Historic Charleston:** Historic Charleston, comprised of Charleston and Dorchester counties, is located on the southeastern coast of the state. Seventy-three buildings in this area are pre-Revolutionary, 136 are late 18th century and more than 600 others were built by the 1840's. Carriage rides down cobblestone streets, historic homes, gardens and buildings from the Colonial era, posh resort islands and Southern hospitality make this region one of the top destinations of out-of-state visitors in South Carolina. Contact: Charleston Trident Convention & Visitors Bureau, P.O. Box -975, Charleston, SC 29402, (803/5 7 7 -25 10).

**Lowcountry and Resort Islands:** The Lowcountry and Resort Islands, comprised of Beaufort, Colleton, Hampton and Jasper counties, are located along the southern tip of the state bordering the Atlantic Ocean and Georgia. Sea marshes, history, secluded beaches, first-class resorts on semi-tropical islands, professional golf and tennis tournaments make the Lowcountry and Resort Islands a unique area of the state. Contact: Lowcountry Council of Governments Tourism Program, PO Box 98, Yemassee, SC 29945, (803/726-5536).

**Santee Cooper Country:** Santee Cooper Country, comprised of Berkeley, Calhoun, Clarendon, Orangeburg, and Sumter Counties, is centered around the Santee Cooper Lakes (Lakes Marion and Moultrie) in the mideastern portion of the state. More than 17 1,000 acres of fresh water lakes, world-class fishing, golf courses, Revolutionary War sites, old plantations and gardens attract thousands of visitors to this area every year. Contact: Santee Cooper Counties Promotion Commission, PO Drawer 40, Santee, SC 29142, (803/ 854-2131).

**Pee Dee Country:** Pee Dee Country, comprised of Darlington, Dillon, Florence, Lee, Marion, Marlboro and Williamsburg counties, is located in the northeast portion of the state. Situated in the heart of the state's agricultural belt, the region is famous for its tobacco auctions and endless fields of cotton. Visitors also find that the area has its share of historic sites, beautiful gardens, colorful festivals, museums, and recreational activities. **Contact:** Pee Dee Tourism Commission, PO Box 3093, Florence, SC 29502 (803/669-0950).

**Capital City and Lake Murray Country:** Capital City and Lake Murray Country, comprised of Lexington, Newberry, Richland and Saluda counties, is located in the middle of the state surrounding Lake Murray. Thousands of tourists visit the State House, universities and colleges, art galleries, museums and the nationally-acclaimed zoo. They also enjoy the recreational activities of Lake Murray. Contact: Lake Murray Tourism & Recreation Association, PO Box 210096, Columbia, SC 29221, (803/781-5940).

**Thoroughbred Country:** Thoroughbred Country, comprised of Aiken, Allendale, Bamberg and Barnwell counties, is located on the mid-western border of the state. Tourists visit Thoroughbred Country to experience the rolling farmland, horse training and racing, peach orchards, old town squares and festivals. Contact: Lower Savannah Council of Governments/ Thoroughbred Country, PO Box 850, Aiken, SC 29802 (803/649-7981).

**Old Ninety Six:** Old Ninety Six, comprised of Abbeville, Edgefield, Greenwood, Laurens, and McCormick counties is located in the western border of the state. Historic homes and churches, a Revolutionary battle site, an opera house, parks on lakes with fishing and boating make Old Ninety Six a unique area of the state which attracts thousands of visitors every year. Contact: Old 96 District Tourism Commission, PO Box 448, Laurens, SC 29360 (803/984-2233)

**Discover Upcountry Carolina:** Discover Upcountry Carolina, comprised of Anderson, Cherokee, Greenville, Oconee, Pickens and Spartanburg counties, is located in the Northwest corner of the state. Discover mountain peaks, whitewater rafting, art galleries, factory outlet stores, backpacking trails and the Cherokee Foothills Scenic Highway. Contact: Discover Upcountry Carolina Association, PO Box 3132, Greenville, SC 29602, (803/233-2690). Anderson, Oconee and Pickens counties, also contact: Pendleton District Historical and Recreational Association, PO Box 565, Pendleton, SC 29670, (803/646-3782).

**Grand Strand:** The Grand Strand, South Carolina's most popular vacation spot, stretches over 60 miles of beaches along the Atlantic Ocean in Horry and Georgetown Counties. The gently sloping beaches are some of the widest on the East coast-perfect for shell hunting, fishing, swimming, sunbathing, and strolling. The Grand Strand is known for its golf courses, with over 60 courses available for play in the area. Historic lowcountry homes, churches, beautiful gardens and shopping all abound along the coast. Contact: Myrtle Beach Area Chamber of Commerce, P.O. Box 2115, Myrtle Beach, SC 29578-2115, (803/626-7444) also contact: Georgetown County Chamber of Commerce, P.O. Box 1776, Georgetown, SC 29442 (803/546-8436 or 800/ 777-7705).



Thomas Lamboll House  
Charleston, SC

<http://www.lambollhouse.com/home.htm>

## South Carolina Travel Information Centers

### South Carolina Department of Parks, Recreation and Tourism

The Travel Information Centers are staffed by the South Carolina Department of Parks, Recreation and Tourism. These centers are located on all interstates coming in the state and on other major highways. An extensive display of literature is available on accommodations and attractions to give travelers an opportunity to see what is available. As an added service, a complimentary reservation service is available for accommodations within the state. The centers will gladly stock a supply of your approved brochure to assist visitors in making reservations at your property.

**BEFORE SENDING ANY LITERATURE TO THE CENTERS A SAMPLE MUST BE SENT TO THE CENTRAL OFFICE FOR APPROVAL AND FOR MAILING INSTRUCTIONS. PLEASE CONTACT THE MANAGER OF VISITOR SERVICES, PRT, 1205 PENDLETON STREET, COLUMBIA, SC 29201 BEFORE TAKING ANY ACTION. (803/734-0125)**



Fantasia Bed & Breakfast, Charleston, SC  
<http://bnblast.com/sc/fantasia/fantasia.html>





## TELEPHONE RESERVATION REQUEST

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

PHONE: \_\_\_\_\_

ARRIVAL DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ VIA: \_\_\_\_\_

DEPARTURE DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ VIA: \_\_\_\_\_

TYPE OF BEDROOM: \_\_\_\_\_ NO. OF PERSONS: \_\_\_\_\_

RATE QUOTED: \_\_\_\_\_ DEPOSIT REQUESTED (DATE) \_\_\_\_\_

AMOUNT OF DEPOSIT: \_\_\_\_\_ DATE RECEIVED: \_\_\_\_\_

CONFIRMATION MAILED (DATE): \_\_\_\_\_

SPECIAL REQUIREMENTS & ARRANGEMENTS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Abingdon Manor, Latta SC

<http://bnblist.com/sc/abingdon/abingdon.html>

**DEPOSIT RECEIPT & RESERVATION CONFIRMATION**

TO: \_\_\_\_\_ DATE: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

We are pleased to confirm receipt of your deposit in the amount of \$ \_\_\_\_\_

to cover the following reservation:

ARRIVAL DATE \_\_\_\_\_ TIME: \_\_\_\_\_

DEPARTURE DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

TYPE OF ROOM: \_\_\_\_\_ # OF PERSONS: \_\_\_\_\_

DAILY RATE INCLUDING BREAKFAST: \$ \_\_\_\_\_

TOTAL COST OF ACCOMMODATIONS: \$ \_\_\_\_\_ X Days = \$ \_\_\_\_\_

MINUS DEPOSIT: \$ \_\_\_\_\_

AMOUNT DUE ON ARRIVAL: \$ \_\_\_\_\_

OTHER ARRANGEMENTS AND REQUIREMENTS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**DEPOSIT REFUND POLICY:**

- Full refund up to 14 days before arrival date
- Full refund minus \$10.00 administration fee up to 7 days before arrival date
- No refund if-cancelled Less than 7 days before arrival date

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\_\_\_\_\_ Host's Name , \_\_\_\_\_ Address \_\_\_\_\_

# RESERVATION SHEET

Month \_\_\_\_\_

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

References and information from the following excellent publications was incorporated into this manual:

**“Developing a Bed and Breakfast Business Plan,”** Robert D. Buchanan, Extension Specialist, Purdue University and Robert D. Espeseth, University of Illinois, Illinois-Indiana Sea Grant Program, IL-IN SG-882,300 February 88, COMM-NA 85AA DSG0830N.

**“Guidelines For Development And Operation of a Bed & Breakfast Home in Alberta,”** Development Division, Alberta Tourism, 16th Floor 10025 Jasper Ave., Edmonton, Alberta T5 J 3Z3

**Bed and Breakfast List of South Carolina:** <http://bnblist.com/sc/sc.htm>

**Pamela Lanier’s Travel Guide, B&B’s in SC:** <http://www.travelguides.com/inns/full/SC/>

**South Carolina Directory of B&B’s:** <http://www.virtualcities.com/ons/sc/scondsdex.htm>

**South Carolina Bed & Breakfast Association:** <http://www.usagetaways.com/sc/scbba/index.html>



Pettigru Place Bed & Breakfast  
Greenville, SC

<http://bnblist.com/sc/pettigru/>



The Strom Thurmond Institute of Government and Public Affairs is Public Service Activity (PSA) of Clemson University. The Institute conducts applied research and service in public policy areas, drawing on the expertise of Clemson University faculty, staff and students. The Institute also enhances awareness of current public policy issues on the campus and throughout the state and region through informal and formal educational programs

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# Starting a Bed & Breakfast Business

## GETTING STARTED

Are you thinking about converting your home into a Bed & Breakfast (B&B) business? There are several reasons why people choose to open a B&B --- supplemental income, restoration of a historic residence, preservation of a family home or farm, tax benefits. Whatever your reason, there are many issues that you need to think about and plan for just as you would for any business venture.

### **Do I Have What It Takes?**

First and foremost, do you or more importantly does your family have what it takes to own and operate a B&B? Sit down with all family members and discuss the answers to the following questions:

- Does the family enjoy meeting, talking, and interacting with people?
- Is the family trusting of others?
- Is the family comfortable with having and entertaining strangers in the home?
- Is the family comfortable with all types of people from different cultures and socioeconomic backgrounds?
- Is the family calm and relaxed around children?
- Does the family mind giving up their privacy?
- Does the family like to cook, clean, and keep the home neat?

If the answers to these questions are an enthusiastic "yes," then you and your family might prove to be successful B&B owners-operators. If the response is less than positive, you should reconsider opening a B&B.

It is important to understand that unless you are located in a popular tourist destination area and have more than just a couple of rooms to book, it will be difficult to make much money in a B&B business venture. From a financial standpoint, it may be necessary to consider additional ways to generate revenue from your B&B. There are other typical ways to add-on income from your B&B, these include opening a full scale restaurant in the facility that is open to the public for lunch and/or dinner; catering events on and/or off premises; renting facility for special events (such as receptions, retreats, etc.); and selling retail products (such as specialty food products, soaps/lotions, candles, T-shirts, etc.).

### **What Will It Cost?**

The initial cost of going into a business is your start-up costs. It usually ends up costing a lot more than you first anticipate, that is why it is so important to actually put a pencil and paper to it --- so you will have an accurate picture of the amount of money you will need to get started. Costs to consider may include the following:

- renovations (electrical, plumbing, kitchen, landscaping, fixtures, security system, etc.)
- interior decoration (painting, wallpapering, furniture, lighting, etc.)
- linens (bed and table)
- towels
- dishes and utensils
- smoke and carbon monoxide detectors, fire extinguishers, and other emergency equipment

- signage
- promotion and advertising (brochures, ads, etc.)
- permits and licenses (MS Business Registration, local privilege or business license, and MS food service permit)
- insurance (liability, medical, property, workers comp, etc.)
- telephone and answering service/machine
- office equipment and supplies (front desk, computer, copier, fax machine, etc.)
- reservation service(s)

Your start-up list may include more or less depending on your facility. The bottom line is that you need to know what the 'bottom line' is in terms of the dollars it will take to get the business started.

#### **Do I Need Any Special Permits/Licenses?**

Early in the planning process, check the local zoning, fire safety codes, and business permit requirements you must comply with at the appropriate agencies. At the state level you will need to complete a Mississippi Business Registration Application ([FORM 70-001-00-1](#)), which can be obtained from the [Mississippi State Tax Commission](#) (601/923-7000); obtain a [MS Food Service Permit](#) (not all B&B's must have this --- you need to check to see if you do or don't); and complete [Food Safety Certification](#). At the federal level you will need an [Employer's Identification Number](#) (EIN) if you have one employee or more. Contact the [IRS](#) to obtain a federal EIN (telephone 800/829-3676).

It is also important that you understand at the front end, all of your tax obligations as a self-employed business owner and employer. The IRS resources listed below will assist you with this.

#### **OPERATING PLAN**

Once you have made the decision to open a Bed & Breakfast (B&B), it is essential that you develop an operating plan for the business to insure that it will run smoothly. Included in the operating plan are guidelines and procedures for handling the day-to-day operation of the business, including policies and procedures, finances, facility maintenance, food preparation/service, and guest relations.

#### **Policies and Procedure**

*Reservations* --- The telephone is the lifeline to your business because this is the primary way customers will make contact with your B&B. It is important that the telephone lines are kept open and that someone is available to answer questions and take reservations. If this is going to create a family problem, it may be necessary to install a separate telephone line for the business. In the event that no one is at home to answer calls, an answering machine with a professional sounding message needs to be activated. Calls should be returned promptly.

You should develop some type of reservation system that works best for your B&B. When a reservation request is received (by telephone, mail, or e-mail), if the date(s) are available, a reservation form should be completed. Customers need to be advised that reservations will be confirmed only with a deposit (by credit card, check, or money order). Once the deposit is received, written confirmation should be forwarded to the customer (by mail, e-mail, or fax). The confirmation should include information regarding your cancellation/refund policy. It is also nice to send directions and/or map to the B&B along with the confirmation, especially if it is in an out-of-the way location. Some B&B's will also include a brochure outlining guest services, check-in/check-out times, final payment, meal times, local tourist information, and any other information that guests need to know about ahead of time.

*House Rules* --- Since B&B's generally operate in a more intimate manner and in closer proximity to the family, it is important that guests know what is and what is not acceptable to you. You and your family need to set guidelines for the following and communicate those guidelines in an effective, yet tactful manner to your guests:

- Pets (yours and theirs)
- Telephone usage
- Kitchen privileges
- Use of television/radio
- Smoking restrictions
- Laundry privileges
- Use of alcoholic beverages

- Keys
- Children (yours and theirs)
- Use of home and grounds
- Visitors
- Parking
- Etc.

### **Finances**

Keeping track of the financial health of your business is essential to its long-term survival. Begin by implementing a good record keeping system. There are many excellent small business record keeping software packages on the market. Using computer technology to manage your business finances will save you a lot of time and money. However, the "old fashioned way" of keeping records by hand in a ledger will work just as well. The bottom line is --- implement some type of system and stick with it!

A good system will help you keep up with your operating expenses, which begin the day you open for business. These expenses include maintenance, utilities, office supplies, food & beverage, salary, wages and employee benefits, mortgage, licenses/permits, advertising/promotion, professional services (attorney, accountant), insurance, reservation service/travel agent fees, association dues, guest supplies, etc. From your records, you should be able to determine a figure for your average monthly operating expenses. You should then compare this figure to the revenue generated from your business to assess the financial health of the business on a regular basis.

Your record keeping system should also help you determine the taxes you must pay (employee, income, etc.). Refer to the IRS tax information resources listed below for more detailed information on business taxation.

### **Facility Maintenance**

Research has shown that first impressions are indeed lasting impressions. The overall appearance of your B&B inside and outside is important. It should be neat, clean, and inviting --- it should make a guest excited to be there and want to come back again! Housekeeping standards should be implemented for guest bedrooms and bathrooms, as well as for the rest of the home.

### **Food Preparation/Service**

Remember that "breakfast" is an integral part of a B&B, therefore it deserves special attention. Your food plan should be well thought out and cover every detail of the meal including types of food (continental or full), food presentation, serving location (kitchen, dining room, in bed, terrace, etc.), table setting (dishes, utensils, linens, fresh flowers, etc.), serving hours, special diet requests, and cleanliness of preparation and serving areas. If meals in addition to breakfast are served, the same attention to detail is required. Be creative in the planning and serving of your meals --- delight your guests, don't disappoint them!

[NOTE: Depending on your particular business, you may need to obtain a [Mississippi Food Service Permit](#) (not all B&B's must have this --- you need to check to see if you do or don't); and may need to complete a [Food Safety Certification](#) course.]

### **Guest Relations**

The keyword here is provide your guests with the "extras." The majority of people who stay in B&B's rather than motels or hotels do so because they want something special --- not the same old thing. It should begin the moment they arrive and follow through until the time they depart --- your guests should be made to feel extra special. Many B&B's charge room rates well above the going rate for nearby motels or hotels --- if you charge more, your guests will expect more and it is up to you to provide the extra service they are seeking. Some extras to think about:

- Airport transportation
- Antique furnishings
- Baby stroller
- Bath products (salts, bubbles, soaks)
- Bathrobe
- Beach/pool towels
- Bicycle
- Books/videos

- Candy
- Clothes brush
- Computer
- Cotton balls
- Down comforter/pillows
- Extension cord
- Fax machine
- Fishing gear
- Flowers
- Fruit basket
- Games
- Hair dryer/curling iron
- Hair products (shampoo, conditioner, spray)
- Hand lotion
- Mail service
- Maps
- Mineral water
- Mouthwash
- Nail polish remover
- Newspapers
- Photocopying
- Picnic basket
- Rain poncho
- Safety pins
- Sewing kit
- Shower cap
- Slippers
- Soaps
- Stationary/postcards
- Sunscreen
- Swimming pool
- Television/VCR
- Tooth brush/paste
- Tourist information
- Umbrella
- Wheelchair

Follow-up is important to future business. Have a guest evaluation card in each room to be filled out before they leave or simply ask them about their stay --- What did they like the most? What could be done better next time? Send a postcard or personal note to their home a couple of weeks after each guest's stay, thanking them for their business and inviting them back.

### **MARKETING**

Two of the biggest mistakes new business owners often make are 1) thinking that everyone will want to buy what they are selling, and 2) thinking that their product will sell itself. A good marketing plan will help eliminate both mistakes. The key elements of marketing are knowing the product and/or service you are selling, identifying the market or target customer, and then promoting/and advertising to that target customer so they will buy the product and/or service --- and in this case the product and/or service is your B&B.

### **Knowing Your Product/Service**

In a B&B business you are primarily selling lodging or overnight accommodations. However, there are other ways to add-on income from your B&B, these include opening a full scale restaurant in the facility that is open to the public for lunch and/or dinner; catering events on and/or off premises; renting facility for special events (such as receptions, retreats, etc.); and selling retail products (such as specialty food products, soaps/lotions, candles, T-shirts, etc.). These add-ons become part of what you are selling. It is important to



understand exactly what you are selling and in most cases it is much more than just a single item.

### **Identifying Your Market**

The customers' needs and wants are very important to the entrepreneur who wants to be successful in the marketplace. But first, you have to "know thy customer and know thy customer well! A good place to start is with your marketing plan, and a good place to start your marketing plan is with the answers to the following questions:

- Are the trends right?  
Are you located in a vacation destination spot?  
Are you a convenient travel stop for business travelers?  
Are you located in a rural area with no or limited local lodging accommodations?
- Is the idea realistic?  
Can you operate a B&B the way you want to and make enough money at it to keep it going?  
Can the family cope with this type of business?
- Would it be worth it if the business succeeds?  
What are your expectations from your B&B --- part time supplemental income or a full time job and income?  
Are you ready and able to handle success and all the work that comes along with it?
- Who is the customer?  
Individuals, retired couples, business travelers, groups, vacationers, honeymooners?  
What is the primary age group - young adults, middle-agers, senior citizens?  
What is income level - B&Bs that provide special services often cater to higher income levels, while others cater to the budget conscience?
- Where is the market?  
Where do they live - where are they coming from to stay at your B&B?
- How many people will actually purchase?  
Are there enough potential customers out there that even would consider staying at a B&B in your location?
- How many people will purchase product from you?  
How many of these people will stay at your B&B?  
What makes your B&B better than the competition --- what gives your business the competitive edge?

### **Promoting and Advertising Your Business**

In order to bring customers into your business, they have to know you exist. Creating public awareness and demand for your product or service involves a commitment to promoting and advertising it. A brochure about your B&B will be the single most important promotional tool you can use to build awareness of your operation.

The brochure needs to be well done. It does not have to be expensive, but it must be good. If you do not have a good working knowledge of the elements of art and principles of design, then you may need to hire a graphic artist to do it for you. The brochure can be distributed locally to chambers of commerce, restaurants, convention/visitors bureaus, Mississippi Welcome Centers, airports, etc. In some cases you may need to distribute the brochure to similar locations and to B&Bs in adjacent states.

Additional methods to consider for promoting your B&B include:

- Building strong credibility within the community. Many guests are referred by people living in your area. Local residents and businesses like to recommend places that are an asset or a unique feature of the community.
- Making local residents aware that you are offering bed and breakfast. This can be an excellent source of referral business, particularly in smaller communities.
- Supporting community programs. Become a member of the chamber of commerce, better business bureau, local merchant association, and the nearest convention/visitors bureau.
- Working with community, regional and state support groups to develop tourism. Help develop promotional literature on the history, seasonal events, and unique features of your community. Be

sure to contact the tourism organization in your area and the [Mississippi Division of Tourism](#). The [Mississippi Division of Tourism](#) produces a [statewide listing of B&Bs](#) in Mississippi.

- Working with the Mississippi Welcome Centers. Supply each Welcome Center with your brochures. Each center is capable of making reservations for you. Contact Rosie Herron-Williams at 601/358-3297 for information about this program.
- Working through the local press. Send regular news releases to area newspapers and radio and television stations. Consider hiring a freelance writer to develop articles for submission to regional newspapers. Some newspapers have a weekly calendar and tourism section that lists the area's accommodations. Some regional and local papers may wish to do a human-interest feature about your facility, which will provide free local publicity.
- Contacting companies and manufacturing plants in your area to make them aware that you are in business and can provide quality accommodations for incoming business travelers.
- Cooperating with area businesses. Call on local business people, especially restaurant managers, plant managers, personnel directors, stores, purchasing agents, real estate salespeople, gas stations and convenience stores. See if they will stock your brochures, as well. Local word-of-mouth referrals are a very solid way to attract guests at little or no cost.
- Contacting private citizens and community leaders. Read the local newspaper carefully and make personal calls to local people holding family reunions, weddings, confirmations, and other events where out-of-town guests may be involved. Send out letters of congratulation concerning awards, promotions and accomplishments to keep your business profile high among community leaders.
- Participating in community events. Keep abreast of activities and events in the community, particularly where these activities generate visitor traffic.
- Answering inquiries promptly. People who make inquiries are your most promising potential customers. Such inquiries should be answered promptly, and with the information requested.
- Developing a logo for your B&B. Use the logo on such things as business cards, brochures, stationary, T-shirts, "give-aways" or complimentary gifts, signage, matchbooks, pens and pencils, advertisements, etc.

Advertising can be an effective promotional tool. It should be used in support of other promotional efforts and not stand-alone. The traditional ways of advertising may be beneficial to your B&B --- newspaper, magazine, radio, television, direct mail, outdoor signs, Internet, and word-of-mouth. You will need to assess the situation and determine what form or forms of advertising will be most beneficial to your B&B. The key to advertising is to spend your advertising dollars on the most effective way to reach your target customer.

#### **Other Considerations**

Other avenues to consider include:

- Listing your B&B in a B&B guidebook. Check bookstores for guidebooks, there are many.
- Participating in the Mississippi Division of Tourism [online Mississippi B&B listings](#). Contact Diana O'Tool at 601/359-3297 for information.
- Listing with a reservation service organization (RSO). You can obtain a current listing of RSOs from [The American Bed and Breakfast Association](#), 1407 Huguenot Road, P O Box 1387, Midlothian, VA 23113, telephone 800/769-2468.
- Contacting travel agents in nearby large cities like New Orleans, Memphis, Birmingham, etc.
- Listing in the yellow pages of the telephone directory.

#### **RESOURCES**

[Mississippi Bed & Breakfast Association](#)

Mr. Loren Quart, President  
601/437-2843

*How to Open a Bed and Breakfast in Your Home* (free publication)

Mississippi Development Authority - Division of Tourism

Diana O'Tool  
601/359-3297

*Mississippi Tour Guide* (free publication - listing of B&B's in MS)

Mississippi Development Authority - Division of Tourism  
Cheryl Eley  
601/359-3297

*Reporting Requirements for Mississippi Small Businesses*

Request a copy of Mississippi from the [Mississippi Development Authority](#) (601/359-3593), or access it [online](#).

[IRS Tax Information](#)

IRS Publication 533 - Self-Employment Tax

IRS Publication 334 - Tax Guide for Small Business

IRS Publication 587 - Business Use of Your Home

IRS Publication 535 - Business Expenses

[Basic Business Start-Up Guide](#)

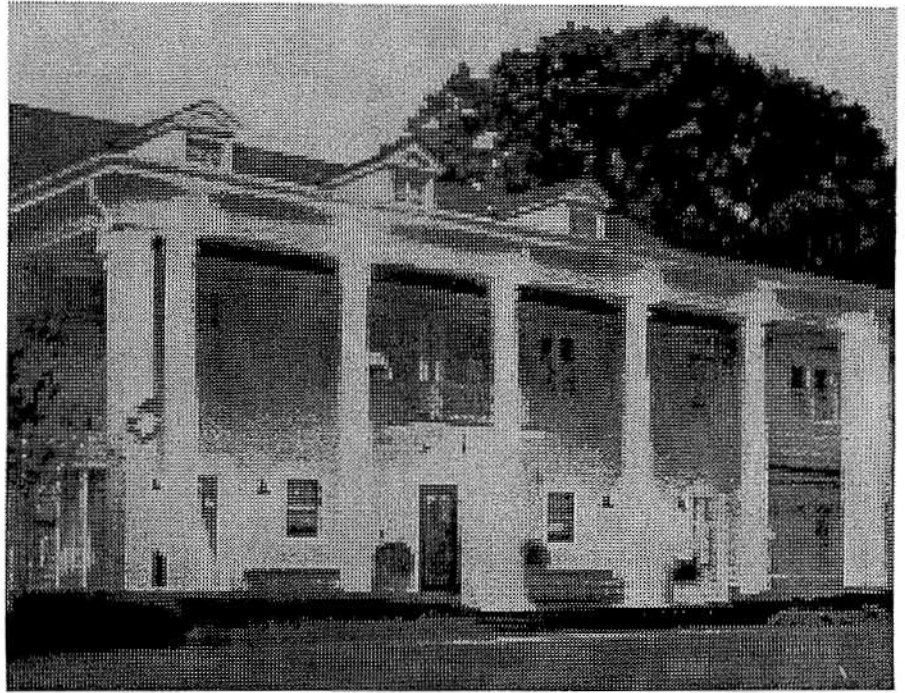
Mississippi State University Extension Service

Mississippi  
Department of  
Economic and  
Community  
Development Tourism  
Welcome Center  
Brochure Policy

Brochure Distribution  
Policy Procedure

Those desiring to have a travel-related publication distributed in the Mississippi Welcome Centers should make a written request with twelve (12) finished sample copies of the publication to Rosie Herron, Mississippi Division of Tourism Development, Post Office Box 849, Jackson, Mississippi 39205. If a publication is approved for placement in the centers, a list of center addresses and a recommended quantity for each center will be sent to you. The brochures should be sent directly to each center according to these quantity recommendations.

The quantity enclosed should be listed both outside and inside the package. Brochure approval must be renewed every two years and whenever any printing change occurs. No brochure will be placed in centers without prior approval.



## *Mississippi Tourism Offices*

Aberdeen Visitors Bureau  
Post Office Box 288  
Aberdeen, Mississippi 39730  
(601) 369-6488  
1-800-634-3538  
FAX: (601) 369-6489

Bay St. Louis Tourism Commission  
Post Office Box 2550  
Bay St. Louis, Mississippi 39521-2550  
(601) 467-6252

Canton Convention and Visitors Bureau  
Post Office Box 53  
Canton, Mississippi 39046  
(601) 859-1307  
1-800-844-3369  
FAX: (601) 859-4379

Clarksdale-Coahoma County Chamber  
& Industrial Foundation  
and Tourism Commission  
Post Office Box 160  
Clarksdale, Mississippi 38614-0160  
(601) 627-7337  
FAX: (601) 627-1313

Cleveland Chamber of  
Commerce/Tourism  
Post Office Box 490  
Cleveland, Mississippi 38732-0490  
(601) 843-2712  
FAX: (601) 843-2718

Columbus-Lowndes Convention and  
Visitors Bureau  
Post Office Box 789  
Columbus, Mississippi 39703  
(601) 329-1191  
1-800-327-2686  
FAX: (601) 329-8969

Corinth Area Tourism Promotion  
Council  
Post Office Box 1089  
Corinth, Mississippi 38835-1089  
(601) 286-3759  
1-800-748-9048  
FAX: (601) 287-5260

Washington County Convention and  
Visitors Bureau  
410 Washington Avenue  
Greenville, Mississippi 38701  
(601) 334-2711  
1-800-467-3582  
FAX: (601) 334-2708

Greenwood Convention & Visitors  
Bureau  
Post Office Drawer 739  
Greenwood, Mississippi 38930  
(601) 453-9197  
(601) 453-9198  
1-800-748-9064  
FAX: (601) 453-5526

Grenada Tourism Commission  
Post Office Box 628  
Grenada, Mississippi 38902-0628  
(601) 226-2571  
1-800-(601) 373-2571  
FAX: (601) 226-9745

Harrison County Tourism Commission  
Post Office Box 6128  
Gulfport, Mississippi 39506  
(601) 896-6699  
1-800-237-9493  
FAX: (601) 896-6796

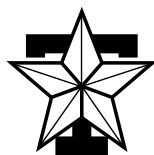
Hattiesburg Convention and Visitors  
Bureau  
Post Office Box 16122  
Hattiesburg, Mississippi 39404  
(601) 268-3220  
1-800-63-TOURS  
FAX: (601) 268-3249

Hazlehurst Chamber of Commerce  
Post Office Box 446  
Hazlehurst, Mississippi 39083  
(601) 894-3752

DeSoto Council  
2475 Memphis Street  
Hernando, Mississippi 38632-1740  
(601) 429-4414  
FAX: (601) 429-0952

Holly Springs Chamber of Commerce  
154 South Memphis Street  
Holly Springs, Mississippi 38635  
(601) 252-2943

# Bird Watching



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Texas Agricultural Extension Service  
THE TEXAS A&M UNIVERSITY SYSTEM

# Establishing a Birding-Related Business

## A Resource Guide





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*Many of the photos in this publication were taken by Bert Frenz. The authors are grateful for his permission to use them.*



Birdwatching is the fastest growing outdoor recreation activity in the United States (Outdoor Recreation Coalition of America, 1996). Many communities are enjoying substantial economic benefits from visiting birders. This has led many landowners and communities to consider establishing birding and wildlife watching enterprises and events as a means of generating income. Attracting birders and nature tourists is one way to diversify a landowner's income and a community's economic base.

Birding and nature tourism are also compatible with environmental preservation. They take advantage of natural scenic areas and habitats that attract specific bird species.

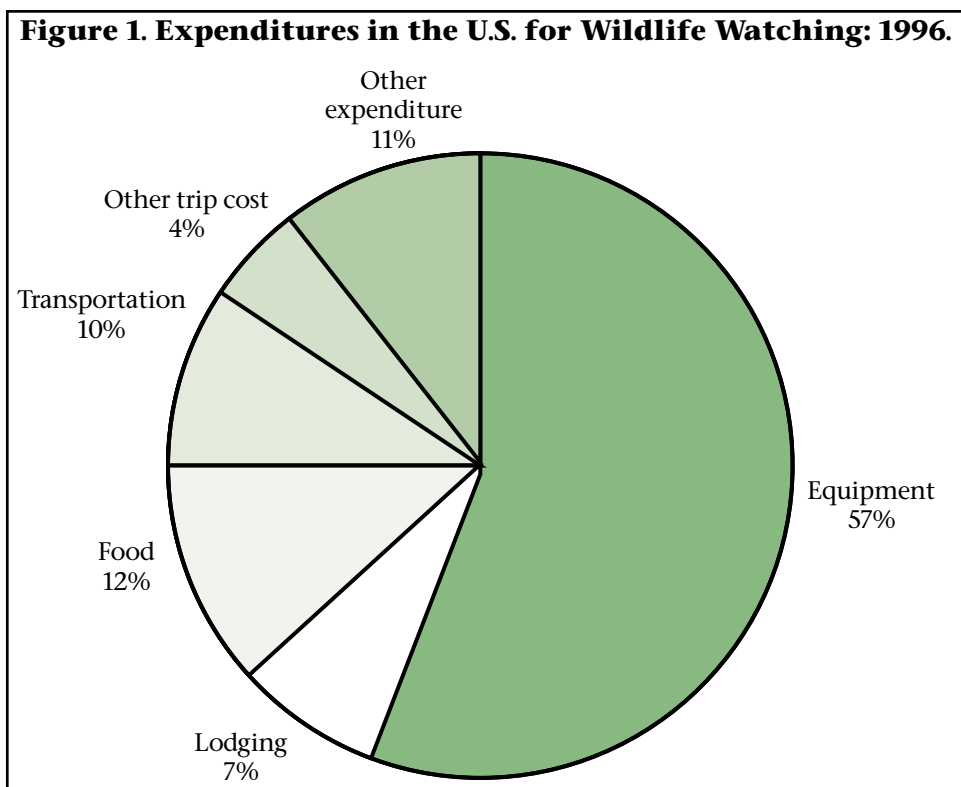
As with any business, success depends on understanding the industry and the customers one is trying to reach. The purpose of this guide is to present current information about the birding industry and birders themselves, and to help those who may want to establish birding-related enterprises.

Information in this publication came from several studies, including the *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (referred to as the National Survey), and the *1993-1994 National Survey of Recreation and the Environment* (referred to as NSRE).

## Understanding the Birding Market

### Economics

The *National Survey* reported that, in 1996, Americans spent approximately \$29 billion on observing, feeding and photographing wildlife. Trip-related expenditures accounted for more than \$9 billion (32 percent) of that total. Figure 1 shows a detailed breakdown of how wildlife watchers spent their money. "Other trip costs" includes such things as guide fees and public land use fees. "Other expenditures" includes magazines and books, membership dues, contributions, land leasing and ownership, and plantings.



Source: 1996 National Survey of Fishing, Hunting and Wildlife-Associated Recreation





Wildlife watchers spent an average of \$554 per person for these activities in 1996, far less than the average amounts spent by hunters (\$1,497) or anglers (\$1,112). Still, wildlife watchers, particularly birders, generate substantial income for some communities and landowners.

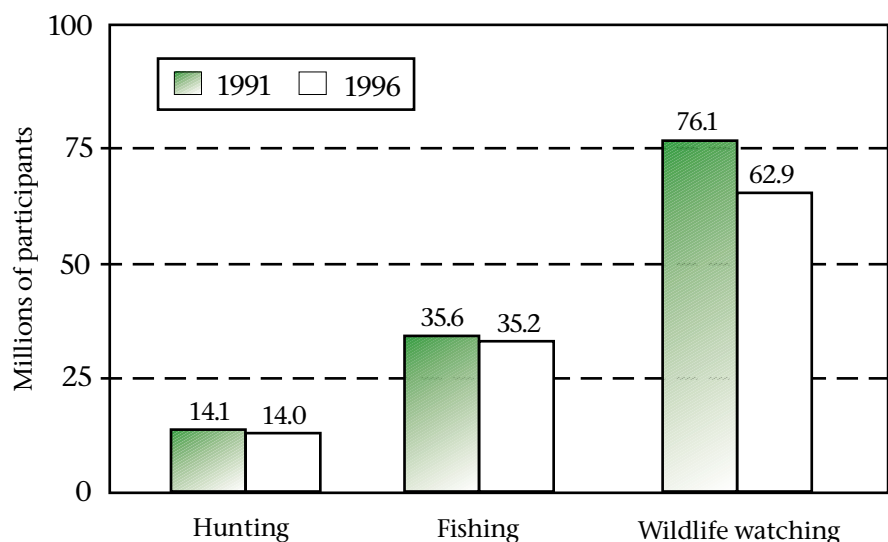
For example:

- The annual Hummer/Bird Celebration in Rockport/Fulton, Texas, attracted 4,500 visitors in 1995. They spent more than \$1.1 million during the 4-day event (an average of \$345 each). Of this amount, \$316,000 was spent on lodging, \$237,000 on meals in restaurants, and \$278,000 on shopping.
- An estimated 20,000 birders spent \$3.8 million at Point Pelee National Park in Ontario during May 1987.
- Approximately 38,000 people visited two birding “hot spots” in southeast Arizona (Ramsey Canyon and San Pedro Riparian National Conservation Area) from July 1991 to June 1992 and spent about \$1.6 million.
- Roughly 100,000 birders visited Cape May, New Jersey in 1993 and spent \$10 million.
- About 6,000 birders traveled to the High Island area of Texas during April and May of 1992 and spent more than \$2.5 million for lodging and other activities.
- The Santa Ana National Wildlife Refuge near McAllen, Texas attracted some 100,000 birders from November 1993 to October 1994. These visitors spent \$14 million in the area.
- About \$5.6 million was spent by the 48,000 people who visited Laguna Atascosa National Wildlife Refuge in south Texas from November 1993 to October 1994.

## Participation Trends

The National Survey reported that 63 million Americans over the age of 16 participated in wildlife watching in 1996. Although this is 17 percent fewer people than was reported in 1991, the number of Americans who said they watched wildlife far outnumbered those who said they hunted or fished (Fig. 2).

**Figure 2. Changes in Outdoor Recreation Participation: 1991-1996.**

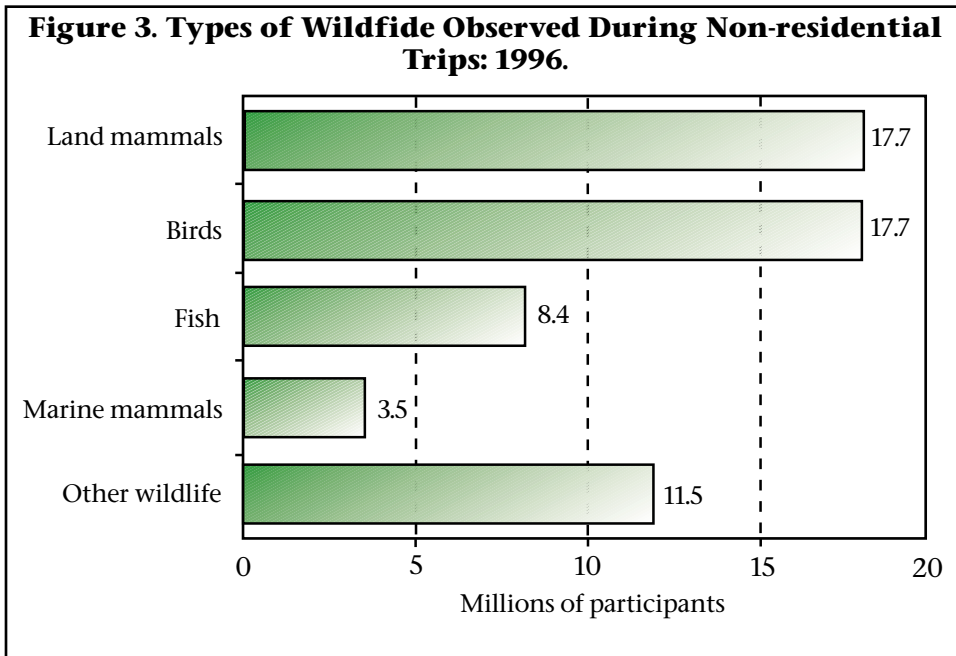


Source: 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Of these 63 million Americans, 23.7 million said they traveled more than 1 mile from home to observe, photograph or feed wildlife. These are considered non-residential wildlife watchers. Residential wildlife watchers (some 61 million) are those who enjoyed wildlife watching within a mile of their homes.

The residential wildlife watchers said they fed birds or other wildlife (54 million), observed wildlife (44 million), photographed wildlife (16 million), maintained special plantings or natural areas for wildlife (13 million), and visited public parks (11 million). Almost all the residential wildlife watchers (96 percent) said they observed birds; many (87 percent) also like to observe mammals.

The non-residential wildlife watchers reported feeding birds (10 million), observing birds (18 million), and photographing wildlife (12 million). During their trips to observe wildlife, an equal number were interested in birds and land mammals (Fig. 3).



Source: 1996 National Survey of Fishing, Hunting and Wildlife-Associated Recreation

Only 25 percent of Texans said they engaged in wildlife watching in 1996, and the number of Texans who were non-residential wildlife watchers had decreased from 1.5 million to 1.3 million since 1991. However, Texas is a prime **destination** for wildlife watchers from across the country and around the world. About 1.4 million Americans said they traveled to Texas to observe wildlife (primarily birds). Only California, Pennsylvania and Florida attract more wildlife watchers. These visitors spent about \$1.2 billion on wildlife watching in Texas.

Table 1 shows the rates of participation in wildlife watching among the U.S. population in 1996 (National Survey).

### Birdwatching Trends

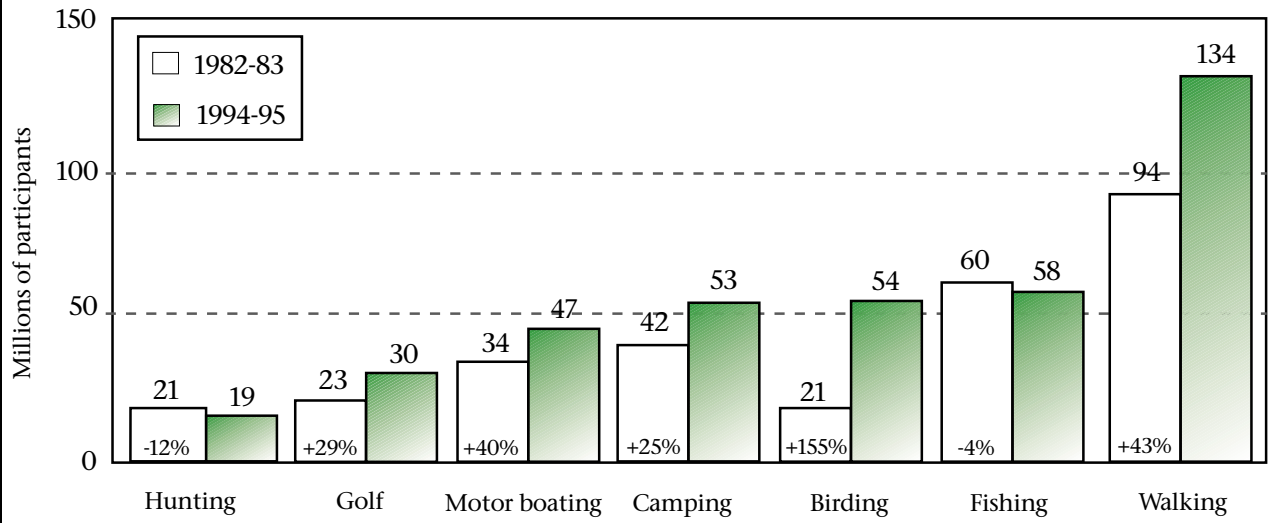
The number of Americans 16 years of age and older who watch birds grew from 21 million in 1982 to more than 54 million in 1994—a 155 percent increase (Fig. 4). However, it is important to keep these figures in perspective.



**Table 1. Rates of Participation in Wildlife Watching.**

Characteristics	% Engaging in residential wildlife watching	% Engaging in non-residential wildlife watching
<b>Total U.S. population</b>	<b>30.1</b>	<b>11.7</b>
Gender		
Male	29.0	12.1
Female	31.2	11.4
Race/Ethnicity		
Anglo-American	33.8	13.2
African-American	10.3	2.5
All others	14.7	7.3
Age		
16 to 17 years	17.6	8.6
18 to 24 years	14.6	8.5
25 to 34 years	26.4	13.0
35 to 44 years	34.4	15.5
45 to 54 years	34.4	14.8
55 to 64 years	35.5	10.6
65 years and older	32.2	6.0
Level of education		
11 years or less	20.6	5.4
12 years	27.2	8.9
1 to 3 years college	32.3	13.2
4 years college	35.1	15.6
5 years or more college	43.2	22.0
Annual household income		
Less than \$10,000	22.1	5.8
\$10,000 to \$19,000	25.7	9.7
\$20,000 to \$29,999	29.6	11.7
\$30,000 to \$39,999	32.3	13.1
\$40,000 to 49,999	36.1	14.4
\$50,000 to \$99,999	36.0	16.2
\$100,000 or more	37.4	17.0

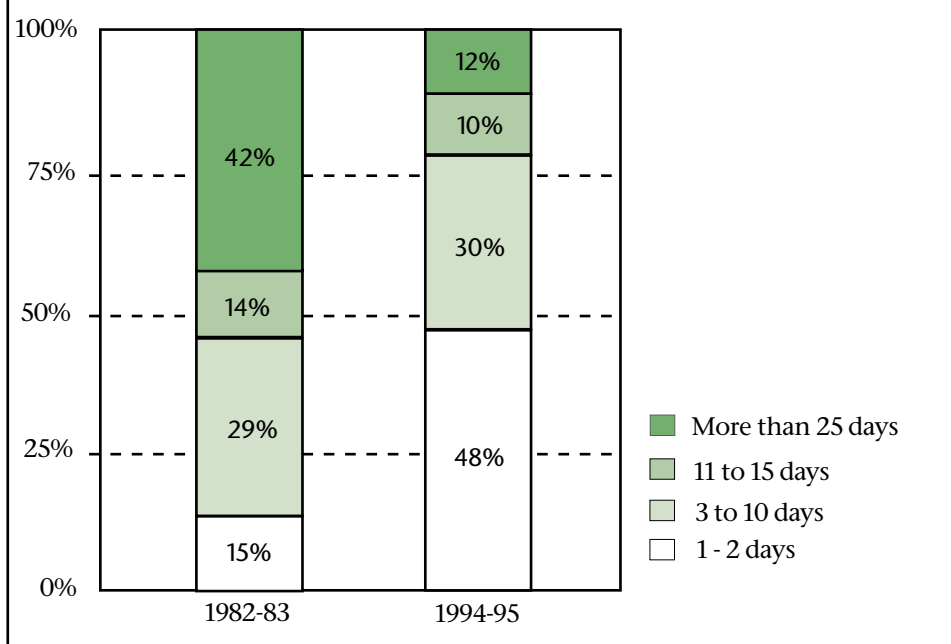
**Figure 4. Changes in Participation in Selected Outdoor Recreation Activities: 1982-1994.**



Source: 1994-95 National Survey of Recreation and the Environment

While the overall number of birders has increased, the average number of days per year they spend birdwatching may have decreased (Fig. 5). According to the *NSRE*, 42 percent of those who said they birdwatched in 1982 reported doing so on 25 or more days that year. Only 15 percent said they observed birds on just one or two occasions. In 1993 the percentages were very different—only 12 percent of birders reported spending 25 or more days on the activity and nearly 50 percent said they went bird watching on only one or two days.

**Figure 5. Comparison of Days Spent Birdwatching: 1982-94.**



Also, these data from the *NSRE* don't reveal whether people were residential or non-residential bird watchers. There are far more bird watchers who do so close to home than who travel to watch birds (*NSRE*).

Finally, there is wide variation in the skills and commitments of birders. A national study of birders reported that 60 percent of those who had gone birding in the last 2 years said they could identify ten or fewer species of birds (Fig. 6). Only 3.2 percent could identify more than 40 birds; only 30 percent said they used binoculars; and only 4 percent said they used a field guide.

So it is important for landowners and communities to be realistic about the birdwatching market. Despite the fact that a large number of Americans say they birdwatch, only a small percentage of them is committed to the activity in a serious way.

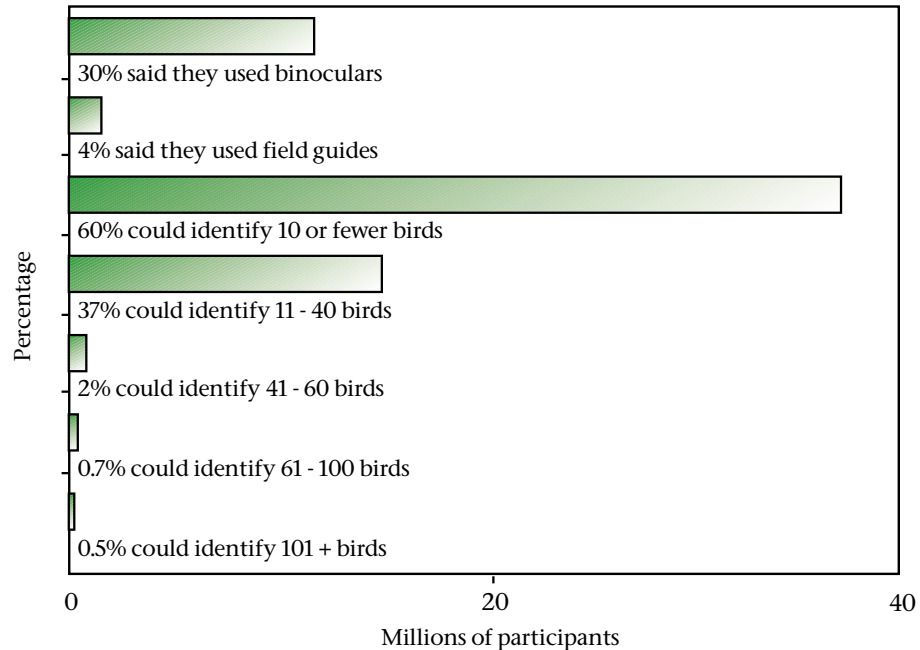
## Characteristics of Wildlife Watchers and Birders

In Table 2, the demographic characteristics of residential and non-residential wildlife watchers are shown (*National Survey*). This a breakdown of the data in Table 1 for the 41.8 percent of the U.S. population who said they participated in either residential or non-residential wildlife watching. Characteristics of these groups are compared to characteristics of members of the American Birding Association. ABA members are generally serious birders, almost all of whom could be expected to travel away from home to watch birds.



**Figure 6. Characteristics of Birders.**

"Of the 43 million Americans who said they birdwatched during the last two years . . ."



Source: Kellert, 1985

From this table we can see that those who travel away from home to watch wildlife tend to be Anglo-American, 25 to 54 years old, have at least a high school education, and have incomes of about \$40,000 or more

Among the ABA members, 66 percent are male, 25 percent are 65 or older, most have a college degree or graduate degree, and 27 percent have annual household incomes of \$100,000 or more.

## Kinds of Birdwatchers

Birdwatchers are not all alike. Knowing the different segments of the birdwatching population can help landowners and communities create and promote attractions for particular segments of the market. The two studies discussed below shed light on the various kinds of birdwatchers.



### **1994 Study of Birders in Alberta, Canada (McFarlane, 1994)**

Birders were asked about their birding habits, perceived skill levels, number of species on their life lists, number of birding magazines to which they subscribed, and the total value of their birdwatching equipment. From this data, the researcher identified four distinct groups of birders: casual birders; novice birders; intermediate birders; and advanced birders (Table 3).



**Casual birders** comprised 43 percent of the respondents. They had the lowest level of skill and experience, and had invested the least in equipment. They were motivated by an appreciation for birds and nature (43 percent), their desire to learn about and conserve the environment (39 percent), and their desire to improve their birdwatching skills (17 percent). Only 33 percent of them main-

**Table 2. Demographic Characteristics of Wildlife Watchers and ABA Members.**

Characteristics	Unites States population %	Residential participants %	Non-residential participants %	ABA members %
Gender				
Male	48.0	46.2	50.0	65.9
Female	52.0	53.8	50.0	34.1
Race/Ethnicity				
Anglo-American	83.1	93.1	93.3	98.3
African-American	9.3	3.2	1.9	0.0
All others	7.6	3.7	4.7	1.7
Age				
16 to 17 years	3.5	2.1	2.6	0.0
18 to 24 years	10.1	4.9	7.3	0.4
25 to 34 years	17.4	15.2	19.3	5.6
35 to 44 years	22.0	25.2	29.1	20.1
45 to 54 years	17.8	20.3	29.1	30.4
55 to 64 years	11.6	11.5	7.7	18.2
65 years and older	17.6	18.8	8.9	25.0
Level of education				
11 years or less	16.8	11.5	7.7	0.5
12 years	35.3	31.8	26.9	4.0
1 to 3 years college	22.3	24.2	25.5	18.6
4 years college	13.9	16.2	18.4	34.4
5 years or more college	11.4	16.4	21.5	42.5
Annual household income				
Less than \$10,000	9.2	6.4	4.1	1.6
\$10,000 to \$19,000	12.1	9.7	8.9	1.2
\$20,000 to \$29,999	15.6	14.4	13.9	8.9
\$30,000 to \$39,999	14.3	14.4	14.2	10.9
\$40,000 to 49,999	11.2	12.6	12.3	11.9
\$50,000 to \$99,999	29.1	32.7	35.7	38.5
\$100,000 or more	8.5	9.9	10.9	26.9

tained lists of birds they had identified. However, 41 percent had participated in organized bird censuses.

Thirty-eight percent of respondents were **novice birders**. They had greater skill and commitment than the casual birders. Their motivations were: learning about and conserving the environment (46 percent); appreciation for birds and nature (28 percent); and improving their birdwatching skills (25 percent). Fifty-six percent kept lists of birds and had participated in bird censuses.

**Intermediate birders** made up 12 percent of the people in the study. They were more skilled and committed than both casual and novice birders. Like novice birders, they were motivated primarily by conservation (40 percent). However, many also wanted to improve their birding skills and see new or rare species (37 percent). About 23 percent were motivated by an appreciation of birds and nature. Three out of four said they listed birds, and seven out of ten had participated in bird censuses.

**Advanced birders** comprised only 7 percent of respondents. They had the highest skill and experience levels. More than half were motivated by a desire to improve their skills and see new or rare species (55 percent). One-third wanted to learn about and conserve the environment. A large percentage of them (91 percent) kept lists of birds they had seen. Nearly eight out of ten had participated in bird censuses; in addition, many of them had led bird walks and made presentations.



**Table 3. Characteristics of Birder Groups Identified by McFarland.**

<b>Characteristic</b>	<b>Casual birders</b>	<b>Novice birders</b>	<b>Intermediate birders</b>	<b>Advanced birders</b>
Days on birding trips in 1991 ( <i>M</i> )	0.98	8.60	48.03	96.47
Perceived skill level (4-point scale from casual to advanced) ( <i>M</i> )	1.90	2.72	3.17	3.38
Number of species on life list ( <i>M</i> )	3.29	33.95	65.46	362.82
Number of birding magazine subscriptions ( <i>M</i> )	0.04	0.16	0.39	2.32
Replacement value of equipment (9 categories from \$0 to >\$5000) ( <i>M</i> )	1.32	3.05	3.03	5.07
Farthest distance traveled to go birding in 1991 (6 categories from 0 to >500 km) ( <i>M</i> )	0.55	2.16	3.87	3.95

*Adapted from McFarland, 1996*

 **1996 Study of Visitors to the Annual Hummer/Bird Celebration in Rockport/Fulton, Texas (Scott, et al., 1996)**

Based on answers to a survey, visitors to this event were categorized into four groups (Table 4).

Twenty-one percent of survey respondents were **generalists and water seekers**. They are not highly skilled birders, take relatively few birding trips, and do not spend a great deal of money on birding. They are attracted to places where they can enjoy water activities such as fishing and marine life tours, as well as nice lodging and restaurants. They like to combine birding with shopping, visiting small towns and historic sites, and other outdoor recreation. They especially like coastal areas.

**Heritage recreationists and comfort seekers** also are not highly skilled or committed birders. They made up about 40 percent of those surveyed. This group is attracted to communities that can provide heritage tours or historical sites, as well as birding opportunities, along with a restful environment and comfortable amenities. They are not interested in other outdoor activities. These individuals spend more money on trips than other groups.

**Outdoor recreationists** are relatively skilled birders. Twenty-five percent of the visitors in the survey were in this group. They are more likely than other birders to make trip decisions on the basis of other outdoor recreation available nearby. That is, outdoor recreationists are likely to birdwatch while involved in other activities such as skiing, hiking, camping and biking. These individuals have little interest in shopping, visiting historic sites or seeking comfortable amenities.

The fourth group was the **serious birders**, who made up 14 percent of the festival visitors. They are the most skilled and the most involved in birdwatching, and travel approximately 1,975 miles per year to pursue their hobby. Their interests are highly specialized. In short, they want to





**Table 4. Characteristics of Birder Groups Surveyed at Hummer/Bird Celebration.**

Characteristics	Generalists and water seekers	Heritage recreationists and comfort seekers	Outdoor recreationists	Serious birders
Number of birding trips taken last year ( <i>M</i> )	6	9	14	28
Miles traveled last year to go birding ( <i>M</i> )	667	1,415	1,930	1,976
Money spent last year on birding ( <i>M</i> )	\$335	\$778	\$1,134	\$1,727
Number of field guides owned ( <i>M</i> )	2.2	3.8	3.8	7.9
Number of organizational memberships ( <i>M</i> )	0.6	1.4	1.4	1.8
Percent who keep a life list	15%	31%	37%	50%
Species able to identify by sight ( <i>M</i> )	37	60	119	150
Total expenses at H/B Celebration ( <i>M</i> )	\$254	\$353	\$242	\$289

*M* = Mean

Source: Scott et al., 1996

observe either new, rare, or a variety of birds, and are not overly concerned with lodging and food accommodations, shopping, or non-birding activities. While serious birders spend the most money overall for birding equipment and travel, it is interesting to note that the heritage recreationists and comfort seekers spent the most at the Hummer/Bird Celebration.

The popular media may portray all birdwatchers as being alike, but as these two studies show, there are many differences among them. Understanding the diversity among birdwatchers is helpful when developing a birding-related enterprise.

## Beginning the Business

To establish any successful business you must first think about your personal motivations for starting the business. Then you should study the industry, determine the market segment you want to reach, and strategies for doing so. Deciding how to package, price and promote your product are other important decisions. The insights and experiences of people who operate birding-related businesses can be very helpful. Ideas in the following section were generated during interviews with seventeen such individuals. Five of them are birding tour guides, five own/operate birding locations and/or lodging, three are birding festival coordinators, and four own businesses that sell birding products (field guides, binoculars, birdhouses, artwork, etc.).

## Recognize Your Motivations

Among the people interviewed, the most common reason for starting a birding-related business was a personal interest in nature, particularly birding. They wanted to transform a





hobby into a money-making business. A second reason, mentioned primarily by landowners, was the need to diversify economically.

While a personal interest in nature and birding is important, it is not sufficient to ensure business success. Those who cater to the public, in any business, must have a strong customer orientation. That means enjoying dealing with all kinds of people, being enthusiastic about entertaining and serving guests, having public relations skills, and having the stamina to work long hours. It is also important to be familiar with finance, accounting, business operations and marketing. Expertise

at birdwatching may also be very important, depending on the product or service you offer.

It is important to realize that a birding-related business is not likely to generate a huge profit. Business owners interviewed said they typically did not turn a profit for 3 years, and often their businesses are not fully self-supporting. One owner said his business simply allows him to pursue his birding hobby: "I'm thrilled if I make enough money at these festivals to cover my expenses. Having a booth at birding festivals allows me to travel to some of the best birding spots in the state and helps pay for my associated costs." Some owners said they probably would not attempt to make their birding businesses their main sources of income, especially if their businesses were rather small-scale.

## Research the Industry and Determine Marketing Strategies

An owner of a birding enterprise made the following observation: "One thing I wish I had done to prepare myself for opening this type of business was to read up on it more. I could have saved myself a lot of time, money and energy if I hadn't learned about this market the hard way."

One way to learn about the market is to study the kinds of information presented earlier in this publication. Knowing the preferences, characteristics, and demographics of the individuals who might be attracted to your product or service will help you make crucial business decisions.

Subscribe to birding magazines and analyze articles about birdwatching. Ads in magazines can provide information about products and services with which you will be in competition. Also attend birding festivals to find out about the competition and meet others who are in the birding business.

Academic or professional journals such as the *Journal of Wildlife Management* and *Human Dimensions in Wildlife* can be helpful. These journals usually can be found in libraries at large universities.

A few national and state birding organizations provide information about their members and about birders in general. The American Birding Association and the National Audubon Society publish magazines and newsletters and have Web sites with information about the latest trends in birding.

State tourism, wildlife, and economic development agencies are another good source of information. In addition to distributing publications, they may also organize educational seminars or conferences or have experts who will consult with you. Local and regional information can be obtained through chambers of commerce and convention and visitors' bureaus.

Once you understand the birding market you can decide which segment of that market you will try to reach with your product or service. The birding market may be segmented by geographic area, demographics, skill level and commitment, or interest in particular products. Or, you may choose to market to more than one segment by developing two or more products, each with its own marketing strategy.

For example, a ranch might be habitat for a number of rare species, and have easy access to an international airport. The ranch owner might decide to pursue serious European birders as his desired market. His marketing strategy might be to advertise in European birding magazines aimed at serious birders.

Or, like the King Ranch in Texas, you might want to attract more than one market segment by offering different services for each. The ranch offers several different birding tours, from a 1-day tour for novice and intermediate birders in which the object is to see many different species, to a specialized tour for serious birders who want to see only rare species.

## Develop the Product “Package”

Many birding enterprises rely on partnerships between two or more individuals or businesses. Small businesses that pool their resources often can create a more attractive product together than they could individually. Tour packages are a good example. A tour package groups several products and services to attract customers. The package might include lodging at a good birding location, meals, guided tours, etc. Some tour packages allow birders to visit areas, both public and private lands, to which they would not otherwise have access. Tour packages are attractive to customers because they include all necessary arrangements and services.

Birding festivals and events are also examples of partnerships in packaging products and services. Communities team up with members of the birding industry. The community provides the location, facilities, advertising, planning and event coordination. Members of the birding industry provide guide services, expert speakers for workshops, and products to purchase. Restaurants, hotels and non-birding businesses also can be part of these cooperative events.

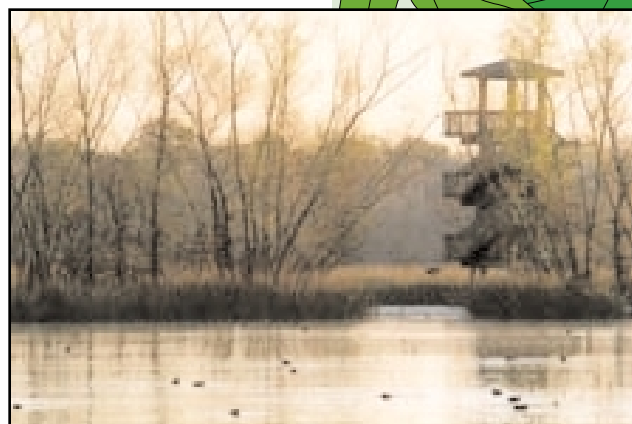
The product “package” also can be quite simple; for example, a landowner might offer access to good birding habitat on a day-fee basis.

## Determine the Price

Whatever the product, its price is important to potential customers. It can be complicated to set a price that strikes a balance between what the customer is willing to pay and what the business needs to charge in order to be profitable. One business owner gives this advice: “People won’t always like, value or appreciate the same things you do. Just because you would be willing to pay a certain price for something doesn’t mean your customers will. Check out what the competition is offering its customers and what they are charging. How does your product compare? Then price accordingly. If your price seems particularly high, make sure to point out the differences between your product and everyone else’s.”

## Promote Your Business

Promotion helps you gain the attention of potential customers. In the birding industry, a good promotional mix includes advertising, publicity and marketing to industry insiders.



**Advertising** is any paid communication about a product or service through the mass media. It can be a good way to reach a wide audience. Ads should be timely, and they should be placed in media that reach the business's intended audience. The King Ranch advertises its tours in birding magazines and newsletters, and reports good response.

Karankawa Plains Outfitting Company, Prude Ranch, B-Bar-B Ranch and other businesses have developed Web pages to reach birders who are scouring the Internet for information on new birding locations. To increase their site hits, these businesses have made an effort to link their sites to different search engines that provide information on birding. Such directories are often regional in nature, and are sponsored both by individuals and by organizations such as the Texas Parks and Wildlife Department.

Birding festival organizers and large-scale tour operators often use direct mail to advertise. Costs of direct mail include purchasing mailing lists, postage and printing, but this can be an effective way to reach people in a given market segment.

Favorable **publicity** can be a powerful promotional tool for any business. An example is an article about a product or service, such as the opening of a new birding/wildlife watching business, in the state's fish and wildlife magazine or in a newspaper. News publicity has two advantages over other forms of promotion—it may influence people who are skeptical about advertisements, and it has the credibility of an unbiased news source.

Satisfying customers and gaining the acceptance of other birding business owners can be the most important way to promote your business. These **industry insiders** have information, contacts and influence that can help you succeed. An excellent way to meet and establish business relationships with others in the industry is to attend birding festivals and other events. You can also invite industry representatives to tour your location, or send them product samples, to gain their opinions and familiarize them with what you have to offer. They may then help spread the word to others.

Networking with nature tourism/birding associations, chambers of commerce, and visitors' bureaus will establish relationships that can help your business.

Birders are being bombarded with information from the many new businesses established in recent years. With so many choices, they are influenced by what they hear from other birders. Positive word-of-mouth promotion may be the most effective kind of all.

One owner of a birding location/accommodation explained how customer references and her association both with industry insiders and local organizations helped her business succeed: "An individual from Texas and Parks and Wildlife explained to us that the diversity of birds and wildlife on our ranch would be attractive to birders from around the country. From there, word got around that we had sort of a birding spectacle, which resulted in visitors coming to our ranch. Because of all the interest, we looked into building an observation room and a bed and breakfast. Now we place ads in various birding magazines, which brings us a lot of customers; but many of our guests are not heavy bird-



ers. The local visitors' bureau directs many tour groups to us for general interest tours. By far, I believe that guests who told others about their positive experiences are our greatest source of advertisement."

## Developing Your Unique Product

Deciding what your product will be, and then developing it, requires some research and forethought. The steps in this process are:

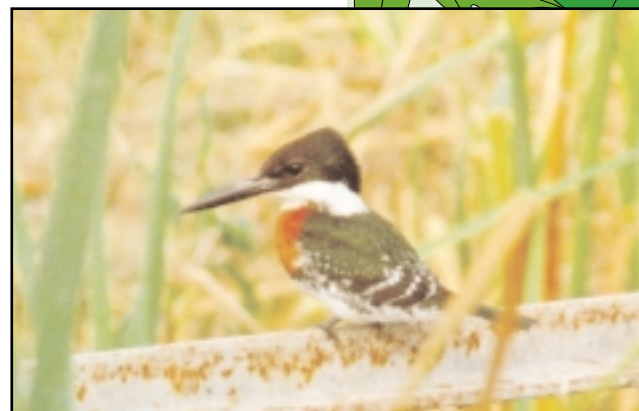
- Identifying your resources.
- Understanding what the true product is.
- Molding resources and experiences to meet customers' demands.

Identifying your resources means determining what it is you have to work with. To do this, list all possible resources, such as: indigenous birds on your land; facilities; business knowledge; familiarity with the outdoors; birding expertise; high quality optics; and business contacts. If you need help identifying resources, you might want to hire a wildlife biologist, wildlife consultant or expert birder to help you analyze your habitat, list the species, and evaluate your land for "birder appeal." A business consultant can help determine other resources.

Although they might not recognize it, customers of birdwatching and other nature-based recreational activities are looking for a mix of things that offers a total experience. For birders, this experience might include seeing a life bird, relaxing, enjoying beautiful surroundings, seeing new places, socializing with travel companions, and making new acquaintances. For some market segments, these and other benefits have a greater effect on customer satisfaction than the number or species of birds seen. For this reason, prospective business owners should be careful to adopt a benefits rather than a product perspective. In other words, what you have to offer is more than a product; it is an experience.

Some aspects of a birding business may be beyond human control. Weather isn't always predictable; rare and indigenous bird species may be present but not always seen; migration timing can vary. It's important to remember that while you may offer an exceptional product or service, these other factors may sometimes cause customers to have unsatisfactory experiences.

The ultimate success of a business often depends on identifying what it has to offer that meets customer demands. This seems to be especially true for the birding industry. To attract birders and their dollars, you need a rare species (or an abundance of species), a desirable atmosphere, or a special method of viewing. Your goal is to mold the resources you have with the experiences you can provide to deliver what customers want. Because not all birders are alike, your product or service may not be appealing to all birders. For examples of this, we can look again at the King Ranch and the B-Bar-B Ranch near Kingsville, Texas. The King Ranch offers a special guided tour for serious birders who want to see two rare Texas specialties—the Ferruginous pygmy owl and the Tropical parula. The tour guide concentrates on helping birders see just these two species in a minimum amount of time.





There are no rare birds to attract serious birders to the B-Bar-B, but the owners capitalize on their location along the route to South Texas and offer upscale accommodations for less devoted birders who may want a different kind of experience. Birders make up just one segment of the business's clientele. The owners recognize that their product consists of an opportunity to relax and socialize in comfortable surroundings, in addition to the birds that may be seen. Both the King Ranch and the B-Bar-B illustrate the way products should be molded from the resources and benefits you have to offer in light of the experiences customers seek.

## Summary

Texas' diverse landscape and large number of bird species draw tourists and birders from all over the world. Many individuals and communities are looking for ways to profit from these visitors. Developing a birding-related business requires research, planning, business sense, personal commitment, customer relations skills, and patience. Those who succeed will recognize that this is a customer service industry; the goal is to provide an enjoyable experience for one's guests.

## Sources of Information

For information on bird censuses and natural resource evaluation:

### **Texas Parks and Wildlife Department**

Wildlife Diversity Branch

4200 Smith School Rd.

Austin, TX 78744

(512) 389-4800

<http://www.tpwd.state.tx.us>

### **Gulf Coast Birding Observatory**

9800 Richmond Ave., Suite 150

Houston, TX 77042

(713) 789-GCBO

<http://www.nol.net/~criley>

### **The Nature Conservancy of Texas**

P.O. Box 1440

San Antonio, TX 78295-1440

(210) 224-8774

<http://www.tnc.org>

For information on birding clubs:

### **Texas Audubon Society**

2525 Wallingwood Dr., Suite 301

Austin, TX 78746-6922

(512) 306-0225

<http://www.audubon.org>

### **American Birding Association**

P.O. Box 6599

Colorado Springs, CO 80934

(719) 578-1614

<http://www.americanbirding.org>

For information about how to develop lodging for guests:

### **Historic & Hospitality Accommodations of Texas**

P.O. Box 1399

Fredericksburg, TX 78624

(800) 428-0368

<http://www.hat.org>

**Texas Hotel & Motel Association**

900 Congress, #201

Austin, TX 78701

1-800-856-4328

<http://texaslodging.com./index.phtml>

For information on the nature tourism industry:

**Texas Department of Economic Development**

Tourism Division

P.O. Box 12728

Austin, TX 78711-2728

(512) 462-9191

<http://research.travel.state.tx.us>

**Texas Nature Tourism Association**

812 San Antonio, Suite 401

Austin, TX 78701

(512) 476-4483

<http://www.tourtexas.com/tnta>

**Texas Agricultural Extension Service**

Recreation, Park and Tourism Sciences

Texas A&M University

2261 TAMU

College Station, TX 77843-2261

(979) 845-5419

<http://agextension.tamu.edu>

Other helpful organizations:

**National Fish & Wildlife Foundation**

1120 Connecticut Ave. NW, Suite 900

Washington, D.C. 20036

(202) 857-0166

<http://www.nfwf.org>

**National Wildlife Federation**

8925 Leesburg Pike

Vienna, VA 22184

(703) 790-4000

<http://nwf.org>

**United States Small Business Administration**

Office of Marketing and Customer Service

409 Third Street SW, Suite 7600

Washington, D.C. 20416

(202) 205-6744

<http://www.sbaonline.sba.gov>

**U. S. Fish & Wildlife Service**

Ecological Services Field Office

Hartland Bank Building

10711 Burnet Rd., Suite 200

Austin, TX 78758

(512) 490-0057

<http://ifw2es.fws.gov/AustinTexas>





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# Birding in the United States: A Demographic and Economic Analysis

*Addendum to the 2001 National  
Survey of Fishing, Hunting and  
Wildlife-Associated Recreation*

Report 2001-1



# Birding in the United States: A Demographic and Economic Analysis

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Genevieve Pullis La Rouche  
Division of Federal Aid  
U.S. Fish and Wildlife Service  
Washington, D.C.

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Washington, D.C. 20240  
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*This report is intended to complement the National and State Reports for the 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation. The report's opinions are the author's and do not represent official positions of the U.S. Fish and Wildlife Service.*

The author thanks Sylvia Cabrera, Richard Aiken, Grant La Rouche, John Charbonneau and Jim Caudill for reviewing earlier drafts of this report.

# Introduction

In January 2002 an unprecedented major media event unfolded in a Louisiana swamp. A team of top ornithologists set out to find the ivory-billed woodpecker, a bird last seen in the United States in 1943 and, until a recent credible citing by a turkey hunter, considered extinct in the U.S. The expedition, funded by a corporate sponsor, received worldwide media attention including coverage by the New York Times, USA Today, and National Public Radio.

This high-profile search for the ivory-billed woodpecker is just one indicator of the growing popularization of birds and birding. Other evidence abounds. A field guide, *Sibley's Guide to Birds*, became a New York Times bestseller. And a quick search of the Internet yields numerous birding sites, some of which list hundreds of birding festivals held around the country each year.

**“For me, the thrill of bird-watching is catching the glimpse of alien consciousness — the uninflected, murderous eye, the aura of reptilian toughness under the beautiful soft feathers, the knowledge that if I were the size of a sparrow, and a sparrow were as big as I am, it might rip my head off without a second’s hesitation.”**

Jonathan Rosen. *The Ghost Bird*.  
*The New Yorker*. 5/14/01.

This growing awareness of birding comes at an odd time; birds are in jeopardy. According to 35-year trend data (1966-2001) from the U. S. Geological Service, almost one-in-four bird species in the United States show “significant negative

trend estimates” (Sauer et al. 2003). This decline is attributed primarily to the degradation and destruction of habitat resulting from human population growth and short-sighted environmental practices such as the razing of wetlands



American Kestrel (*Falco sparverius*) by Dave Menke, USFWS

needed by migratory birds. Although there is a certain irony in people becoming enthusiastic about birds as they disappear, it also presents an opportunity: birders may be the economic and political force that can help save the birds.

The following report provides up-to-date information so birders and policy makers can make informed decisions regarding the protection of birds and their habitats. This report identifies who birders are, where they live, how avid they are, where they bird and what kinds of birds they watch. In addition to demographic information, this report also provides two kinds of economic measures. The first is an estimate of how much birders spend on their hobby and the economic impact of these expenditures. The second is the net economic value of birding, that is, the value of birding to society.

By understanding who birders are, they can be more easily educated about pressures facing birds and bird habitats. Conversely, by knowing who is likely *not* a birder, or who is potentially a birder, information can be more effectively tailored. The economic values presented here can be used by resource managers and policy makers to demonstrate the economic might of birders, the value of birding — and by extension, the value of birds. In fact, research shows that these kinds of values help wildlife managers make better decisions and illustrate the value of wildlife to American society (Loomis 2000).

All data presented here is from the wildlife-watching section of the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR). It is the most comprehensive survey of wildlife recreation in the U.S. Overall, 15,300 detailed wildlife-watching interviews were completed with a response rate of 90 percent. The Survey focused on 2001 participation and expenditures by U.S. residents 16 years of age and older.



Jim Hudgins, USFWS

### Birding Trends

Is birding increasing? Despite recent popularization (high visibility within the media and popular culture and increased recognition of the sport within American homes) of birding, past FHWAR Survey results point to a more complicated story. A comparison of results from the 1991, 1996, and 2001 estimates show that bird-watching around the home has decreased rather than increased over that 10-year period (USFWS). In 1991, 51.3 million people reported observing birds around their homes. In 1996 that number dropped to

42.2 million and in 2001 to 40.3 million. Because the 2001 Survey is the first time people were asked if they specifically watched birds on trips away from home, it cannot be said conclusively if this activity increased or decreased. However, in all three Surveys, people were asked if they observed, fed, or photographed birds away from home. These numbers indicate a net decrease in away-from-home birding from 24.7 million in 1991 to 18.5 million in 2001 but a slight uptick from 1996 (17.7 million) to 2001.

# Birders

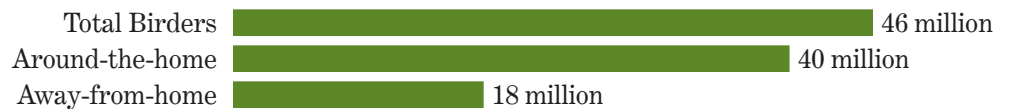
In 2001 there were 46 million bird-watchers or birders, 16 years of age and older, in the United States — a little over one in five people. What is a birder? The National Survey uses a conservative definition. To be counted as a birder, an individual must have either taken a trip a mile or more from home for the primary purpose of observing birds and/or closely observed or tried to identify birds around the home. So people who happened to notice birds while they were mowing the lawn or picnicking at the beach were not counted as birders. Trips to zoos and observing captive birds also did not count.

Backyard birding or watching birds around the home is the most common form of bird-watching. Eighty-eight percent (40 million) of birders are backyard birders. The more active form of birding, taking trips away from home, is less common with 40 percent (18 million) of birders partaking.



Red-winged Blackbirds (*Agelaius phoeniceus*) by John and Karen Hollingsworth, USFWS

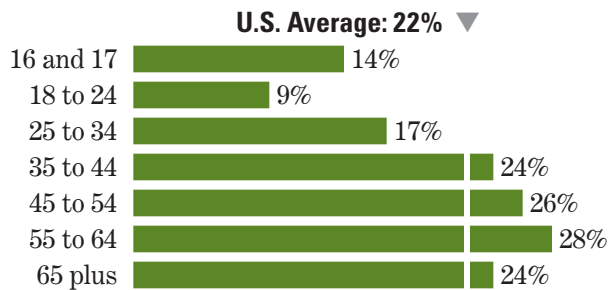
**Chart 1. Birders in the United States: 2001**  
(16 years of age and older.)



**Table 1. Age Distribution of the U.S. Population and Birders: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

Age	U.S. Population	Number of Birders	Participation Rate
16 and 17	7,709	1,043	14%
18 to 24	22,234	1,894	9%
25 to 34	35,333	5,990	17%
35 to 44	44,057	10,414	24%
45 to 54	40,541	10,541	26%
55 to 64	25,601	7,177	28%
65 plus	36,823	8,893	24%

**Chart 2. Birders' Participation Rate by Age**



The average birder is 49 years old and more than likely has a better than average income and education. She is slightly more likely to be female, and highly likely to be white and married. There is also a good chance that this birder lives in the northern half of the country in a small city or town. Does this paint an accurate picture of a birder? Like all generalizations the description of an “average” birder does not reflect the variety of people who bird, with millions falling outside this box. The tables and charts show in numbers and participation rates (the percentage of people who participate) birders by various demographic breakdowns.

The tendency of birders to be middle-age or older is reflected in both the number of birders and participation rates. Looking at the different age breakdowns in Table 1, the greatest number of birders were in the 35 to 44 and 45 to 54 age groups. People age 55 to 64 had the highest participation rates while the participation rate was particularly low for people ages 18 to 24. Birders who take trips away from home to pursue their hobby were on average slightly younger at 45 years old compared to backyard birders who were on average 50 years old.



Tina Watson, USFWS



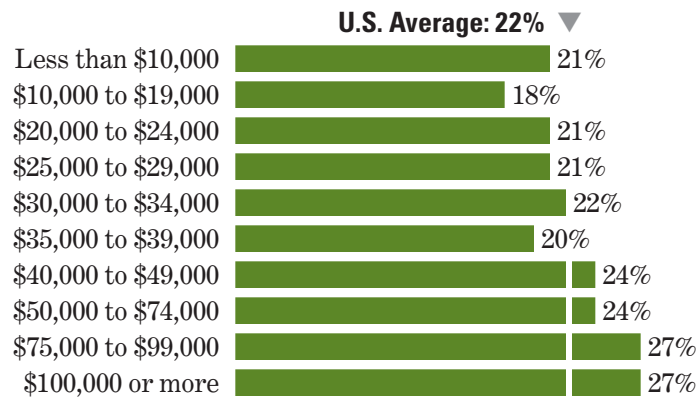
The higher the income and education level the more likely a person is to be a birder. Twenty-seven percent of people who live in households that earn \$75,000 or more were bird-watchers — 5 percent above the national average of 22 percent. Education, which is often highly correlated with income, shows the same trend. People with less than high school education participated at 14 percent — far below the national average — while people with five or more years of college had the highest participation rate at 33 percent. See Tables 2 and 3 for more information.

**Table 2. Income Distribution of the U.S. Population and Birders: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

<i>Income</i>	<i>U.S. Population</i>	<i>Number of Birders</i>	<i>Participation Rate</i>
Less than \$10,000	10,594	2,212	21%
\$10,000 to \$19,000	15,272	2,754	18%
\$20,000 to \$24,000	10,902	2,335	21%
\$25,000 to \$29,000	11,217	2,392	21%
\$30,000 to \$34,000	11,648	2,618	22%
\$35,000 to \$39,000	9,816	2,005	20%
\$40,000 to \$49,000	16,896	4,116	24%
\$50,000 to \$74,000	31,383	7,476	24%
\$75,000 to \$99,000	17,762	4,771	27%
\$100,000 or more	19,202	5,224	27%

Detail does not add to total due to non-response.

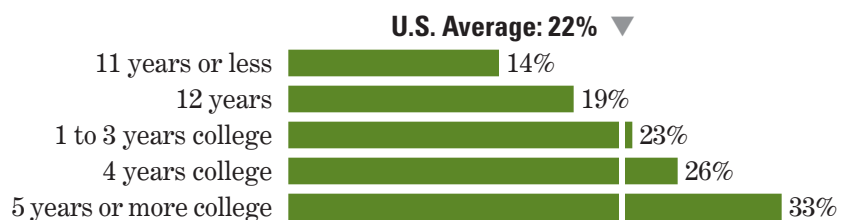
**Chart 3. Birders' Participation Rate by Income**



**Table 3. Educational Distribution of the U.S. Population and Birders: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

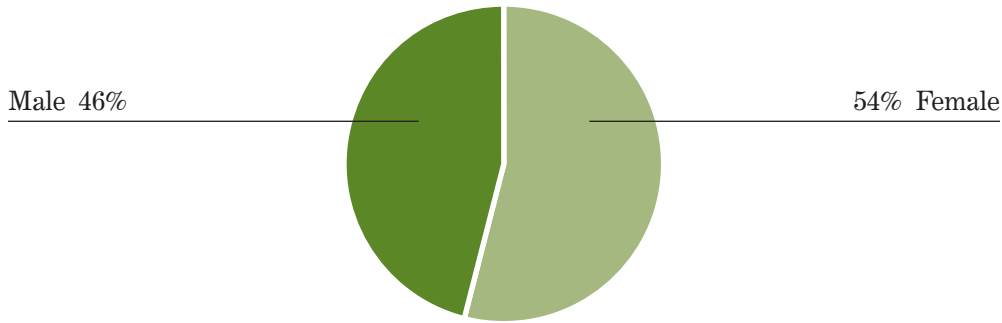
	<i>U.S. Population</i>	<i>Number of Birders</i>	<i>Participation Rate</i>
11 years or less	32,820	4,627	14%
12 years	73,719	13,933	19%
1 to 3 years college	49,491	11,363	23%
4 years college	34,803	8,922	26%
5 years or more college	21,646	7,107	33%

**Chart 4. Birders' Participation Rate by Education**



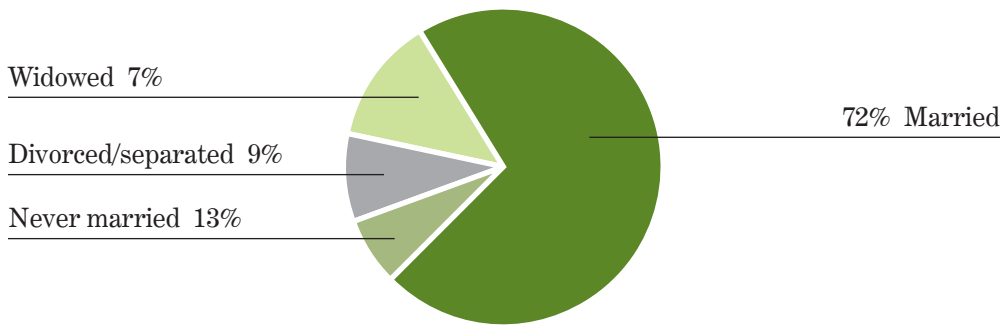
**Chart 5. Percent of Birders — by Gender**

(Population 16 years of age and older. Numbers in thousands.)



Unlike hunting and fishing where men were overwhelmingly in the majority, a slightly larger percent of birders were women — 54 percent in 2001. And most birders, 72 percent, were married.

**Chart 6. Percent of Birders — by Marital Status**



Tami Heilmann, DOI

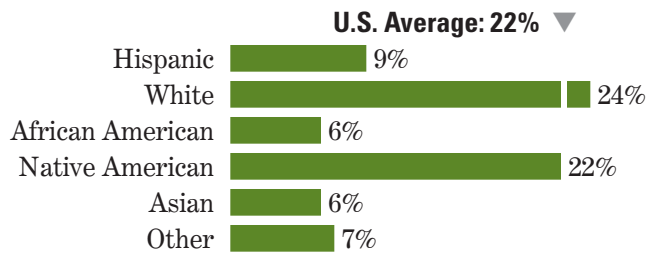
Excepting Native American participation, birders are not a racially or ethnically diverse group. Ninety-four percent of birders identified themselves as white. The scarcity of minority birders is not just a reflection of their relatively low numbers in the population at large, it's also a function of low participation rates. The participation rates of African-Americans, Asians, and Hispanics were all 9 percent or lower while the rate for whites, 24 percent, was slightly above the 22 percent national average. Native Americans on the other hand had a participation rate (22 percent) on par with the national average.

The sparser populated an area, the more likely its residents were to watch birds. The participation rate for people living in small cities and rural areas was 28 percent — 6 percent above the national average. Whereas large metropolitan areas (1 million residents or more) had the greatest number of birders, their residents had the lowest participation rate, 18 percent. See Table 5.

**Table 4. Racial and Ethnic Distribution of the U.S. Population and Birders: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

	U.S. Population	Number of Birders	Participation Rate
Hispanic	21,910	1,880	9%
White	181,129	43,026	24%
African American	21,708	1,243	6%
Native American	1,486	321	22%
Asian	7,141	436	6%
Other	833	55	7%

**Chart 7. Birders' Participation Rate by Race and Ethnicity**



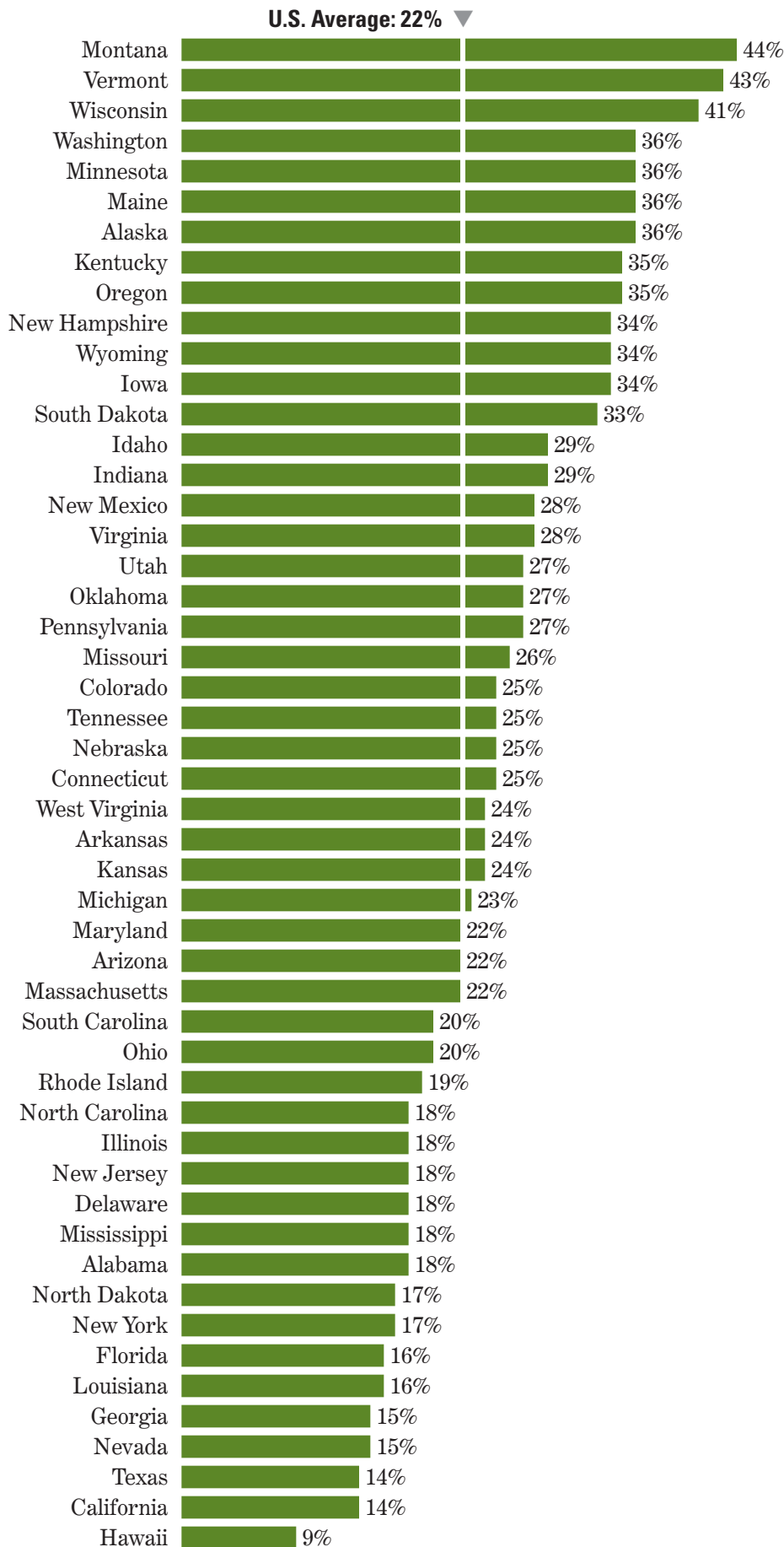
**Table 5. Percent of U.S. Population Who Birded by Residence: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

Metropolitan Statistical Area (MSA)	U.S. Population	Number of Birders	Participation Rate
1,000,000 or more	112,984	20,868	18%
250,000 to 999,999	41,469	8,991	22%
50,000 to 249,000	16,693	4,622	28%
Outside MSA	41,151	11,470	28%



Prothonotary Warbler (*Protonotaria citrea*) by John and Karen Hollingsworth, USFWS

**Chart 8. Birding Participation Rates by State Residents: 2001**  
(Population 16 years of age and older)

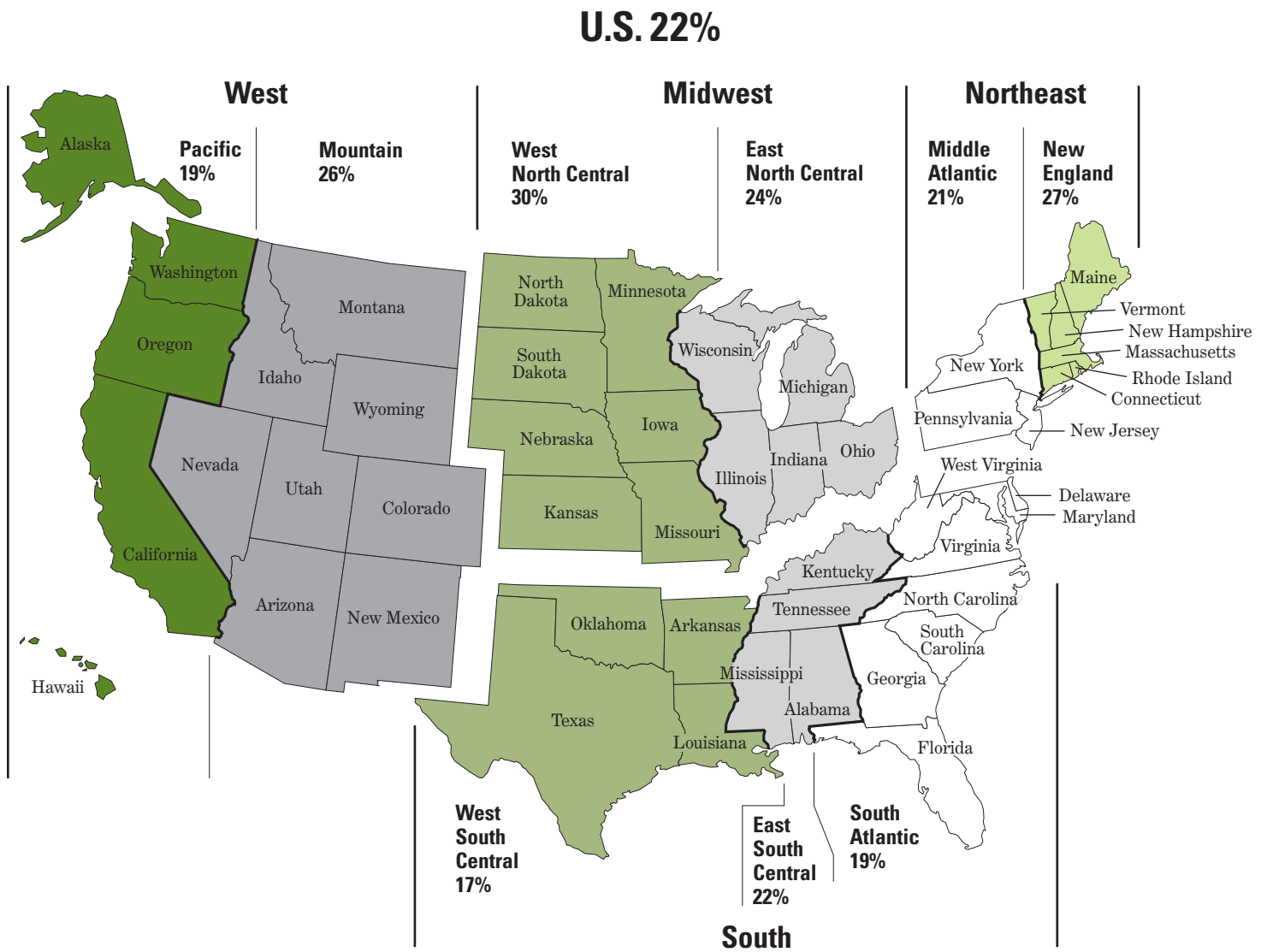


When measured in terms of the percent of state residents participating, states in the northern half of the United States generally had higher levels of participation than did states in the southern half. While 44 percent of Montanans and 43 percent of Vermonters watched birds, only 14 percent of Californians and Texans did. See Chart 8.



Jim Hudgins, USFWS

**Figure 1. Birders' Participation Rates by Region of Residence: 2001**  
 (Population 16 years of age and older. Numbers in thousands.)



The participation rate was highest (30%) in the West North Central region of the United States (see Figure 1). The New England states had the second highest participation rate at 27 percent with a close third going to the Rocky Mountain states (26 percent). The West South Central states had the lowest rate of 17 percent while the Pacific and South Atlantic states yielded slightly higher rates, both 19 percent. However, in terms of sheer numbers, the Pacific and South Atlantic states had the most resident birders — 7 million and 8 million respectively, while New England had the least, 3 million.

**Table 6. Birding by State Residents and Nonresidents: 2001**  
(Population 16 years of age and older. Numbers in thousands.)

<i>State</i>	<i>Total Birders</i>	<i>Percent State Residents</i>	<i>Percent Nonresidents</i>
Alabama	703	90	10
Alaska	321	51	49
Arizona	1,168	70	30
Arkansas	548	88	12
California	3,987	91	9
Colorado	1,077	74	26
Connecticut	732	88	12
Delaware	172	63	37
Florida	2,363	80	20
Georgia	1,063	84	16
Hawaii	164	48	52
Idaho	478	60	40
Illinois	1,815	90	10
Indiana	1,423	94	6
Iowa	813	93	7
Kansas	569	87	13
Kentucky	803	91	9
Louisiana	608	86	14
Maine	595	61	39
Maryland	1,068	82	18
Massachusetts	1,263	86	14
Michigan	1,961	88	12
Minnesota	1,471	90	10
Mississippi	437	88	12
Missouri	1,299	85	15
Montana	558	55	45
Nebraska	386	83	17
Nevada	343	63	37
New Hampshire	569	57	43
New Jersey	1,335	85	15
New Mexico	531	70	30
New York	2,802	88	12
North Carolina	1,296	80	20
North Dakota	134	60	40
Ohio	1,899	93	7
Oklahoma	760	91	9
Oregon	1,187	77	23
Pennsylvania	2,721	91	10
Rhode Island	193	76	25
South Carolina	742	84	16
South Dakota	271	68	32
Tennessee	1,420	76	24
Texas	2,268	94	6
Utah	616	67	33
Vermont	383	53	47
Virginia	1,818	86	14
Washington	1,877	86	14
West Virginia	428	80	20
Wisconsin	1,944	86	14
Wyoming	388	33	67

Bird watching by state residents tells only part of the story. Many people travel out-of-state to watch birds and some states are natural birding destinations. Wyoming reaped the benefits of this tourism with a whopping 67 percent of their total birders coming from other states. The scenic northern states of New Hampshire, Vermont, Montana, and Alaska also attracted many birders — all had more than 40 percent of their total birders coming from other states.

### Where and What Are They Watching?

Backyard birding is the most prevalent form of birding with 88 percent of participants watching birds from the comfort of their homes. Forty percent of birders travel more than a mile from home to bird, visiting a variety of habitats on both private and public lands.

Of the 18 million Americans who ventured away from home to watch birds, public land rather than private land was visited more frequently, although many visited both. Eighty-three percent of birders used public land such as parks and wildlife refuges, 42 percent used private land, and 31 percent visited both. See Chart 9.

The most popular setting to observe birds was in the woods (73%), followed by lakes and streamside areas (69%) and brush-covered areas and fields (62% and 61%). Less popular sites were the ocean (27%) and manmade areas (31%) such as golf courses and cemeteries. See Table 7.

What kinds of birds are they looking at? Seventy-eight percent reported observing waterfowl, making them the most spied on type of bird. Songbirds were also popular with 70 percent of birders watching them, followed in popularity by birds of prey (68%) and other water birds such as herons and shorebirds (56%). See Chart 10.

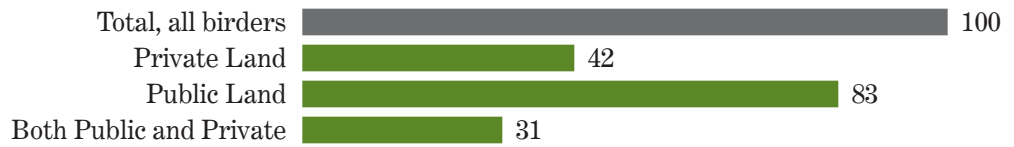
**Table 7. Sites Visited by Away-From-Home Birders: 2001**

(Population 16 years of age and older. Numbers in thousands.)

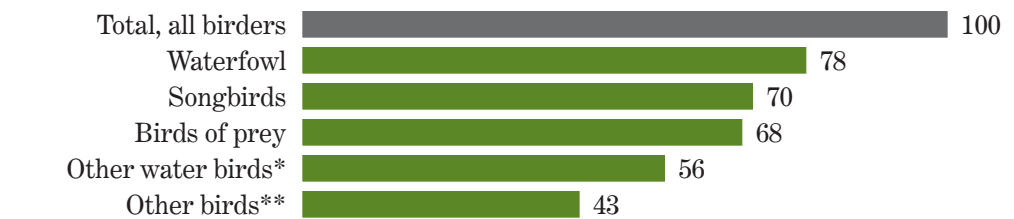
	<i>Number of Birders</i>	<i>Percent</i>
Total, all birders	18,342	100
Woodland	13,405	73
Lake and Streamside	12,615	69
Brush-covered areas	11,324	62
Open field	11,184	61
Marsh, wetland, swamp	8,632	47
Man-made area	5,770	31
Oceanside	4,921	27
Other	2,418	13

\* Detail does not add to total because of multiple responses.

**Chart 9. Percent of Away-From-Home Birders — by Public and Private Land Visited**



**Chart 10. Percent of Away-From-Home Birders — by Type of Birds Observed**



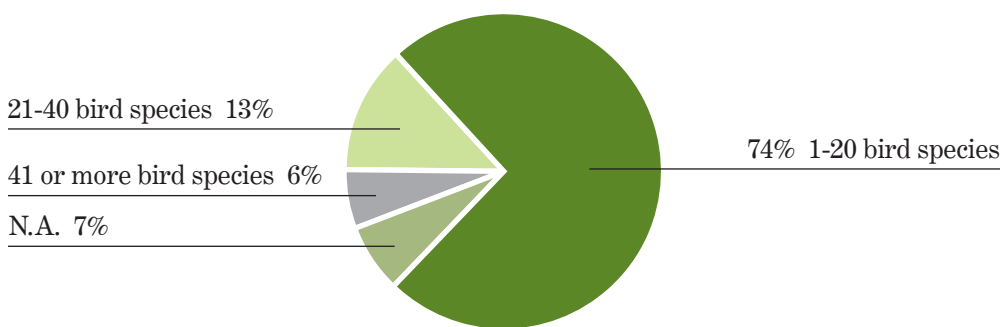
\*shorebirds, herons, etc.

\*\*pheasants, turkeys, etc.

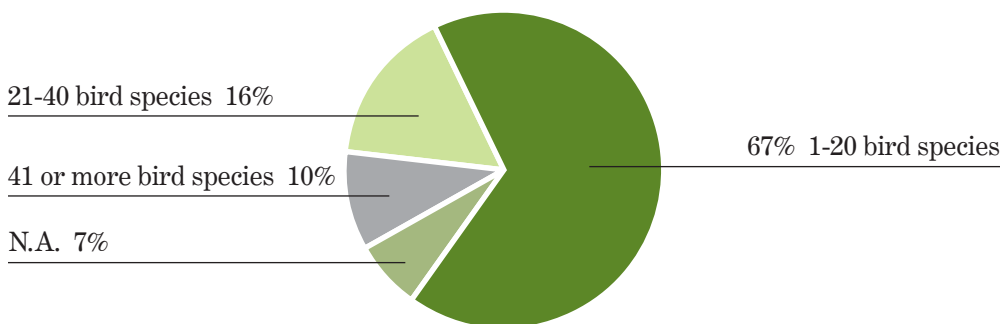


Kathryn Truett, USDA FS

**Chart 11. Percent of Around-the-Home Birders Who Can Identify Birds by Sight or Sound**



**Chart 12. Percent of Away-From-Home Birders Who Can Identify Birds by Sight or Sound**



### Avidity

All people identified as birders in this report said that they took an active interest in birds — defined as trying to closely observe or identify different species. But what is the extent of their interest? In order to determine their “avidity” the following factors were considered: the number of days spent birdwatching; the number of species they could identify; and if they kept a bird life list.

Presumably because of the relative ease of backyard birding, birders around the home spent nine times as many days watching birds as did people who traveled more than a mile from home to bird watch. In 2001, the median number of days for backyard birders was 90 and for away-from-home birders it was 10.

Although birders are investing a fair amount of time pursuing their hobby, most do not appear to have advanced identification skills. Seventy-four percent of all birders could identify only between 1 to 20 different types of bird species, 13 percent could identify 21 to 40 birds and only 8 percent could identify more than 41 species. Skill levels are higher for birders who travel from home to bird watch compared to backyard birders — 10 percent of away-from-home birders could identify 41 or more birds as opposed to 6 percent of backyard birders.

Tallies of birds seen during a birder’s life, sometimes called birding life lists, were kept by only 5 percent of birders. This was roughly the same for backyard birders and away-from-home birders alike.

### Avidity Trends

If we can’t say there are more birders can we say that birders are more knowledgeable about their hobby than in the past? In order to gauge birders’ avidity and level of expertise, the 2001 Survey asked birders how many birds they can identify — a question last asked in the 1980 Survey\* (USFWS). A comparison of responses show that skill levels did not change much in that 20 year time period. For both years, the same percent, 74, was in the

beginner category (1 to 20 species of birds) and roughly the same percent, 13 and 14, respectively, fell into the intermediate (21 to 40 birds) level. A slightly higher percentage of expert birders, however, (41 or more species) was found in the 2001 Survey, 8 percent versus 5 percent in the 1980 Survey. Yet in another sign that the more things change the more they stay the same, almost the same portion, 4 and 5 percent, kept birding life lists.

**Table 8. Percent of Birders\* Who Can Identify Birds by Sight or Sound and Who Kept Birding Life Lists: 1980 and 2001 Comparison**

	1980	2001
1-20 bird species	74%	74%
21-40 bird species	14%	13%
41 or more bird species	5%	8%
Kept bird life list	4%	5%

\* In 1980 the question was asked of all wildlife-watchers (formerly called non-consumptive) and in 2001 the question was asked of only birders.



# The Economics of Bird Watching

## Measures of Economic Value

Putting a dollar figure on birding can appear a tricky business. How can dollars be used to value something as intangible as the enjoyment of birds and birding? Looked at from a practical perspective we live in a world of competing resources and dollars. Activities such as golfing and industries such as computer software are regularly described in terms of jobs generated and benefits to consumers. The same economic principles that guide the measure of golf and software apply also to birding.

Expenditures by recreationists and net economic values are two widely used but distinctly different measures of the economic value of wildlife-related recreation. Money spent for binoculars in a store or a sandwich in a deli on a trip has a ripple effect on the economy. It supplies money for salaries and jobs which in turn generates more sales and more jobs and tax revenue. This is economic output or impact, the direct and indirect impact of birders' expenditures and an example of one of two economic values presented in this paper. Economic impact numbers are useful indicators of the importance of birding to the local, regional, and national economies but do not measure the economic benefit to an individual or society because, theoretically, money not spent on birding (or golf, or software) would be spent on other activities, be it fishing or scuba diving. Money is just transferred from one group to another. However, from the perspective of a given community or region, out-of-region residents spending money for birding represents real economic wealth.

Another economic concept is birding's economic benefit to individuals and society: the amount that people are willing to pay over and above what they actually spend to watch birds. This is known as net economic value, or consumer surplus, and is the appropriate economic measure of the benefit to individuals from participation in wildlife-related recreation (Bishop, 1984; Freeman, 1993; Loomis et al., 1984;

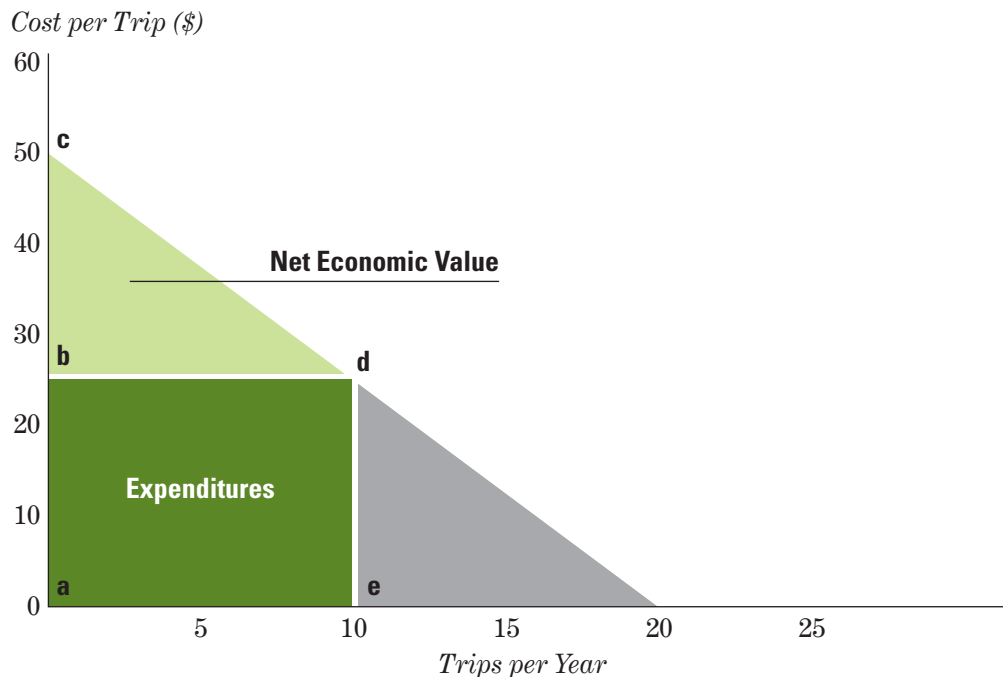
McCullum et al. 1992). The benefit to society is the summation of willingness to pay across all individuals.

Net economic value is measured as participants' "willingness to pay" above what they actually spend to participate. The benefit to society is the summation of willingness to pay across all individuals. There is a direct relationship between expenditures and net economic value, as shown in Figure 2. A demand curve for a representative birder is shown in the figure. The downward sloping demand curve represents marginal willingness to pay per trip and indicates that each additional trip is valued less by the birder than the preceding trip. All other factors being equal, the lower the cost per trip (vertical axis) the more trips the birder will take (horizontal axis). The cost of a birding trip serves as an implicit price for birding since a market price generally does not exist for this activity. At \$60 per trip, the birder would choose not to watch birds, but if birding were free, the birder would take 20 birding trips.

At a cost per trip of \$25 the birder takes 10 trips, with a total willingness to pay of \$375 (area acde in Figure 2). Total willingness to pay is the total value the birder places on participation. The birder will not take more than 10 trips because the cost per trip (\$25) exceeds what he would pay for an additional trip. For each trip between zero and 10, however, the birder would actually have been willing to pay more than \$25 (the demand curve, showing marginal willingness to pay, lies above \$25).

The difference between what the birder is willing to pay and what is actually paid is net economic value. In this simple example, therefore, net economic value is \$125 ( $(\$50 - \$25) 10 \div 2$ ) (triangle bcd in Figure 2) and birder expenditures are \$250 ( $\$25 \times 10$ ) (rectangle abde in Figure 2). Thus, the birder's total willingness to pay is composed of net economic value and total expenditures. Net economic value is simply total willingness to pay minus expenditures. The relationship between net economic value and

**Figure 2. Individual Birder's Demand Curve for Birding Trips**



**Table 9. Birders' Expenditures for Wildlife Watching: 2001**  
(Population 16 years of age and older. Thousands of dollars.)

<i>Expenditure item</i>	<i>Expenditures (\$)</i>
<b>Total, all items</b>	<b>31,686,673</b>
<b>Trip-Related Expenditures</b>	
Total, trip-related	7,409,679
Food	2,646,224
Lodging	1,851,206
Public transportation	682,202
Private transportation	1,790,951
Guide fees, pack trip or package fees	110,374
Private land use fees	48,999
Public land use fees	108,414
Boating costs	135,381
Heating and cooking fuel	35,928
<b>Equipment and Other Expenses</b>	
Total, equipment and other expenses	24,276,994
Wildlife-watching equipment, total	6,010,141
Binoculars, spotting scopes	471,264
Cameras, video cameras, special lenses, and other photographic equipment	1,431,807
Film and developing	837,868
Bird food	2,239,259
Nest boxes, bird houses, feeders, baths	628,060
Daypacks, carrying cases and special clothing	288,648
Other wildlife-watching equipment (such as field guides, and maps)	113,235
Auxiliary equipment, total	523,700
Tents, tarps	163,999
Frame packs and backpacking equipment	121,217
Other camping equipment	238,835
Other auxiliary equipment (such as blinds)	117,267
Special equipment, total	11,158,302
Off-the-road vehicle	5,512,624
Travel or tent trailer, pickup, camper, van, motor home	4,657,752
Boats, boat accessories	946,688
Other	41,238
Magazine	297,780
Land leasing and ownership	4,197,666
Membership dues and contributions	808,101
Plantings	639,986

## Facts-at-a-Glance

*46 Million Birders*

*\$32 Billion in Retail Sales*

*\$85 Billion in Overall Economic Output*

*\$13 Billion in State and Federal Income Taxes*

*863,406 Jobs Created*

expenditures is the basis for asserting that net economic value is an appropriate measure of the benefit an individual derives from participation in an activity and that expenditures are not the appropriate benefit measure.

Expenditures are out-of-pocket expenses on items a birder purchases in order to watch birds. The remaining value, net willingness to pay (net economic value), is the economic measure of an individual's satisfaction after all costs of participation have been paid.

Summing the net economic values of all individuals who participate in an activity derives the value to society. For our example let us assume that there are 100 birders who bird watch at a particular wildlife refuge and all have demand curves identical to that of our typical birder presented in Figure 2. The total value of this wildlife refuge to society is \$12,500 ( $\$125 \times 100$ ).

### Birders' Expenditures and Economic Impact

Birders spent an estimated \$32 billion (see Table 9) on wildlife-watching in 2001. This estimate includes money spent for binoculars, field guides, bird food, bird houses, camping gear, and big-ticket items such as boats. It also includes travel-related costs such as food and transportation costs, guide fees, etc.

*When using the numbers in Tables 9 and 10 it is important to know that these dollar figures represent the money birders spent for all wildlife-watching recreation — not just birding. The 2001 Survey collected expenditure data for people who fed, photographed, or observed wildlife. Expenditure data was not collected solely for birding. It is possible that people who watched birds in 2001 may have spent money on other*

**Table 10. Economic Impact of Birders: 2001\***  
(Population 16 years of age and older.)

Retail Sales (expenditures)	\$31,686,673,000
Economic Output	\$84,931,020,000
Salaries and Wages	\$24,882,676,000
Jobs	863,406
State Income taxes	\$4,889,380,000
Federal Income taxes	\$7,703,308,000

\* Amount that birders spent on all wildlife watching.

types of wildlife-related recreation such as binoculars for whale-watching or gas for a moose-watching trip rather than only bird-watching. Therefore, these estimates for birding expenditures may be overestimates.

This \$32 billion that birders spent generated \$85 billion in economic benefits for the nation in 2001. This ripple effect on the economy also produced \$13 billion in tax revenues and 863,406 jobs. For details on economic impact estimation methods see Appendix A.

The sheer magnitude of these numbers proves that birding is a major economic force, driving billions in spending around the county. On a local level, these economic impacts can be the life-blood of an economy. Towns such as Cape May, New Jersey, and Platte River, Nebraska, attract thousands of birding visitors a year generating millions of dollars — money that would likely otherwise be spent elsewhere.

#### Estimated Net Economic Values

As stated earlier, the willingness to pay above what is actually spent for an activity is known as net economic value. This number is derived here by using a

survey technique called contingent valuation (Mitchell and Carson, 1989). Respondents to the 2001 Survey were asked a series of contingent valuation (CV) questions to determine their net willingness to pay for a wildlife watching trip. *Please note that the data presented here are net economic values for wildlife watching trips — not for bird watching trips solely.* However, since the vast majority of away-from-home wildlife watchers are birders (84 percent), the values presented here are acceptable for use in valuing birding trips. For details on net economic value estimation methods please see Appendix A.

As seen in Table 11, the net economic value per year for a wildlife watcher in their resident state is \$257 per year or \$35 per day. Wildlife watchers who travel outside their state have a different demand curve (they generally take fewer trips and spend more money) and therefore have their own net economic values of \$488 per year and \$134 per day.

When and how can these values be used? These numbers are appropriate for any project evaluation that seeks to quantify benefits and costs. They can be used to evaluate management decisions (actions)

that increase or decrease participation rates. In a simple example, if a wildlife refuge changed its policies and allowed 100 more birders to visit per year, the total value to society due to this policy change would be \$25,700 ( $\$257 \times 100$ ) per year (assuming all visitors are state residents). This value, however, assumes that these 100 birders could and would watch birds only at this refuge and that they would take a certain number of trips to this refuge. In a more realistic example, if the refuge changed its policy and stayed open two more weeks a year and knew that 100 people visited each day during this period then the benefit to society could be estimated by multiplying the number of people by days ( $100 \times 14$ ) by the average value per day (\$35) for a total of \$49,000. If the refuge had data on the number of in-state and out-of-state visitors then the numbers could be adjusted to reflect their appropriate value.

Net economic values also can be used to evaluate management actions that have a negative affect on wildlife watching. For example, if a wildlife sanctuary was slated for development and birders were no longer able to use the site, and if the sanctuary manger knew the number of days of birding over the whole year (e.g, 2,000 days) it is possible to develop a rough estimate of the loss from this closure. This estimate is accomplished by multiplying net economic value per day (\$35) by the days of participation (2,000) for a value of \$70,000 per year.

Two caveats exist to the examples above: (1) if bird watchers can shift their birding to another location then the values are an over-estimate; and (2) if a loss of wildlife habitat causes an overall degradation in the number of birds and in the quality of birding then the values are an under-estimate.

**Table 11. Net Economic Values for Wildlife Watching: 2001**  
(Population 16 years of age and older.)

	Net economic value per year	Standard error of the mean	95 percent confidence interval	Net economic value per day of birdwatching	Standard error of the mean	95 percent confidence interval
State Residents	\$257	12	\$233 – 282	\$35	2	\$32 – 39
Nonresidents	\$488	37	\$415 – 561	\$134	12	\$110 – 158

# Conclusion

Back in Louisiana, the search for the ivory-billed woodpecker ended in disappointment. After an exhaustive two week search, none were found. Optimism, however, continues to prevail. In a group statement the expedition team said they think the bird may exist based on the availability of good quality habitat and other evidence.

This optimism of always looking hopefully into the next tree is the esprit-de-corps of birders. As this report shows, birders come from many walks of life and watch a variety of birds in different settings. Their enthusiasm for birding also translates into spending, thereby

contributing significantly to national and local economies. The high values birders place on their birding trips is a solid indicator of birding's benefit to society.

While the numbers of birders may not have grown statistically, the power of a mobilized birding community and the willingness of mass media sources and the general public to give play to birding issues has an impact felt deeply in the economy and promotes the sustainability of bird habitats. Hopefully, the information in this report will allow resource managers and policy makers to make informed management decisions when birds and birding are involved.



Grant La Rouchie

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Cape May Warbler (*Dendroica tigrina*)  
by Steve Maslowski, USFWS

# Appendix A. Methods

## Economic Impact Methods

The 2001 National Survey contains estimates of annual travel and equipment expenditures by wildlife-watching participants. Travel expenditures were obtained only for away-from-home participants while equipment expenditures were obtained for both around-the-home and away-from-home wildlife watchers. To obtain the economic impact figures, these expenditures were used in conjunction with an economic modeling method known as input-output analysis. The estimates of economic activity, jobs, and employment income were derived using IMPLAN, a regional input-output model and software system. State and federal tax impacts are based on industry-wide averages for each industrial sector.

## Contingent Valuation Methods

Using expenditure and trip data collected from respondents earlier in the survey, respondents were presented with their average number of wildlife-watching trips in 2001 and average cost per trip. If the respondents did not think this information was accurate they were allowed to change it to what they thought was the accurate number of trips and/or an accurate cost per-trip. The respondent was then asked how much money would have been too much to pay per trip. This question was reiterated in another form in case there was misunderstanding (the full series of questions is in Appendix B). Assuming a linear demand curve, annual net economic value was then calculated using the difference between current cost and the maximum cost at the intercept and the number of trips taken in 2001.

The valuation sequence was posed in terms of numbers of trips and cost per trip because respondents were thought more likely to think in terms of trips. The economic values here are reported in days to facilitate their use in analysis.

Outliers were deleted if respondents answered in a way that resulted in zero or negative willingness to pay. Observations were also dropped from the sample if the CV responses resulted in an annual net economic value for an activity that exceeded 5 percent of an individual's household income.



Grant La Rouché

# Appendix B. Contingent Valuation Section from the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

## RESIDENT STATE

Note: These series of questions were asked about ALL trips taken for the PRIMARY PURPOSE of observing, photographing, or feeding wildlife during the ENTIRE calendar year of 2001 in the respondent's state of residence.

You reported taking [X] trips for the PRIMARY PURPOSE of observing, photographing, or feeding wildlife in [RESIDENT STATE]. Is that correct?

- 1—Yes
- 2—No

[IF NO] How many trips did you take for the PRIMARY PURPOSE of observing, feeding or photographing wildlife in [RESIDENT STATE] (from Wave 1) during 2001?

*Zero was allowed as a valid response.*

In your current and/or previous interview(s), you reported that you spent on average \$[X] per trip during 2001 where your PRIMARY PURPOSE was to observe, photograph, or feed

wildlife in [RESIDENT STATE]. Would you say that cost is about right?

- 1—Yes
- 2—No

[IF NO] How much would you say is the average cost of your current and/or previous trip(s) during 2001 where your PRIMARY PURPOSE was to observe, photograph, or feed wildlife in [resident state]? If you went with family or friends, include ONLY YOUR SHARE of the cost.

*Zero was allowed as a valid response.*

What is the most your trip(s) to observe, photograph, or feed wildlife in [RESIDENT STATE] could have cost you per trip last year before you would NOT have gone at all in 2001, not even one trip, because it would have been too expensive? Keep in mind that the cost per trip of other kinds of recreation would not have changed.

*Zero was allowed as a valid response.*

So, in other words, [X] would have been too much to pay to take even one trip to observe, photograph, or feed wildlife in 2001 in [RESIDENT STATE] ?

- 1—Yes
- 2—No

[IF NO] How much would have been too much to pay to take even 1 trip to feed, photograph, or observe wildlife in 2001 in [RESIDENT STATE] ?

*Zero was allowed as a valid response.*

## RANDOM STATE NOT EQUAL TO RESIDENT STATE

Note: These series of questions were asked about ALL trips taken for the PRIMARY PURPOSE of observing, photographing, or feeding wildlife during the ENTIRE calendar year of 2001 in a state other than the respondent's state of residence. If the respondent took a trip in more than one state as a nonresident, one state was randomly chosen.

You reported taking [X] trip(s) for the PRIMARY PURPOSE of observing, photographing, or feeding wildlife in [STATE]. Is that correct?

- 1—Yes
- 2—No

[IF NO] How many trips did you take for the PRIMARY PURPOSE of observing, feeding and photographing wildlife in [STATE] during 2001?

*Zero was allowed as a valid response.*

In your current and/or previous interview(s), you reported that you spent on average \$ [X] per trip during 2001 where your PRIMARY PURPOSE was to observe, photograph, and feed wildlife in [STATE]. Would you say that cost is about right?

- 1—Yes
- 2—No

How much would you say was the average cost of your current and/or previous trip(s) during 2001 where your PRIMARY PURPOSE was to observe, photograph, and feed wildlife in [STATE]? If you went with family or friends, include ONLY YOUR SHARE of the cost.

*Zero was allowed as a valid response.*

What is the most your trip(s) to observe, photograph, or feed wildlife in [STATE] could have cost you per trip last year before you would NOT have gone at all in 2001, not even one trip, because it would have been too expensive? Keep in mind that the cost per trip of other kinds of recreation would not have changed.

*Zero was allowed as a valid response.*

So, in other words, [X] is too much to pay to take even one trip to observe, photograph, or feed wildlife in 2001 in [STATE]?

- 1—Yes
- 2—No

[IF NO] How much would be too much to pay to take even 1 trip to feed, photograph, or observe wildlife in 2001 in [STATE]?

*Zero was allowed as a valid response.*

U.S. Fish & Wildlife Service  
Division of Federal Aid  
Washington, DC 20240  
<http://federalaid.fws.gov>

August 2003

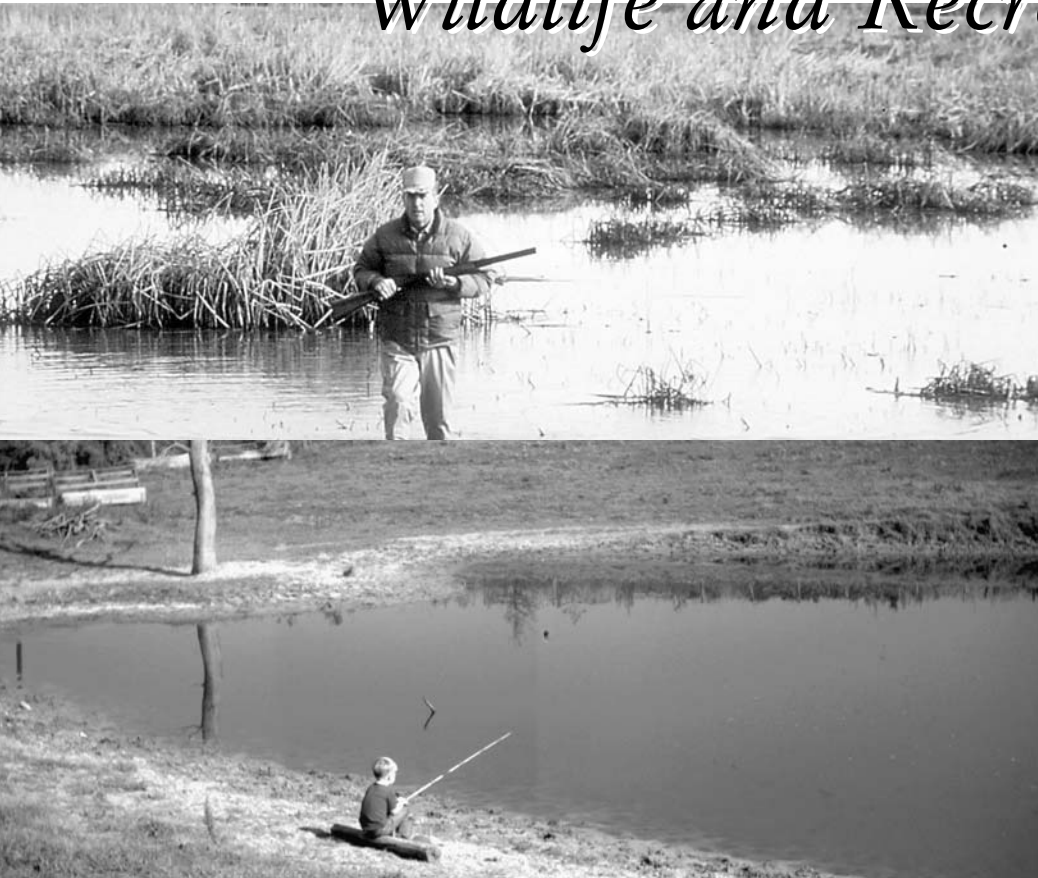




# Business Planning

# NATURAL RESOURCE ENTERPRISES

## *Wildlife and Recreation*



## BUSINESS CONSIDERATIONS FOR PRIVATE LANDOWNERS

**M**ore than two-thirds of the land within the United States is owned and managed by private landowners. Managing private lands is essential for sustaining and enhancing the natural resource base and for meeting the public's increasing outdoor recreational demands.

Farms, ranches, and private forest lands are economic entities and, for most owners, must be managed as a business to become profitable. Altering food and fiber production, or otherwise changing land use, to sustain and enhance the natural resources on private lands can be challenging. A natural resource base must be available that provides sufficient quality and

quantity to develop, manage, and enhance. With a sufficient natural resource base to build upon, alternative natural resource enterprises can provide another source of dependable annual income. Using the right management techniques, stewardship skills, and comprehensive business plan are all necessary parts of success.

There are a variety of types of natural resource-based enterprises that may let you, as a private landowner, diversify your operation. These include such products as pine straw collection for mulch; wild fruits; mushrooms; services for tours; guides for hunting, fishing,

or wildlife watching, hiking, and riding; trails, recreational access for hunting, fishing, horseback riding, and other similar activities.

Obviously the kind of enterprise to be developed depends on the resources available, client demand, the landowner's interest and objectives, and clients' willingness to pay. This publication will help you identify key business considerations to diversify your existing land management operation by incorporating a sustainable natural resource-based enterprise.

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## DEVELOP A BUSINESS PLAN

The first step in developing a natural resource enterprise/business should be developing a business plan. The business plan is a guide to help determine if the enterprise will be feasible. It outlines the mission and goals of the proposed enterprise and provides a guide to keep the enterprise focused. It also educates interested investors or lending institutions about the enterprise and its economic feasibility. Most lending agencies require a written business plan before making loans for start-up or expansion.

What should a business plan include? A good outline is provided in "The Entrepreneur's Tool Kit," published by the Mississippi Development Authority. You can access this document on the Internet at [www.mississippi.org](http://www.mississippi.org). The Kit contains a section titled "A Guide for a Preparing Business Plan."

A logical outline for preparing the business plan should include the following:

- Resources Inventory*
- Business Plan Introduction*
- Marketing Plan*
- Operating Plan*
- Organization Plan*
- Financial Plan*

## RESOURCES INVENTORY

The starting point for developing a business plan is an inventory of existing and available resources. You must determine what resources are available. A resource inventory helps determine whether you can make the property an economically feasible business and what type of business enterprise to pursue. Once you select an enterprise, you evaluate resources you have to determine if anything is lacking that would prevent development of the planned business. The resource inventory not only identifies what is lacking but also which resources are underused. Underused resources can be separated into three types: physical, labor, and financial. Once completed, the resource inventory should become part of the overall business plan.

### ■ *Physical Resources Inventory*

The physical resources inventory is a list of assets such as land, soil types and vegetation (habitat), buildings, equipment, machinery, and animal populations (domestic and wild). Following are items to consider:

- ✓ The number of acres you own or lease, the stability of the ownership or leased property, and a description of the land. Is the land uplands or low lying areas? Are some areas subject to flooding or

holding water during rainy seasons, and could such flooding be an advantage or disadvantage?

- ✓ Water sources on the property. List any lakes, ponds, rivers, springs, and intermittent streams on the property or that may cross or border the property.
- ✓ Type of vegetation on the property. Note how many acres are in forest, crops, pasture, and/or fallow.
- ✓ Existing land use or management improvements. Is there fencing around the property? Are the boundaries clearly marked? Is there all-weather road access to the property, and do roads exist throughout the property? Do structures such as out-buildings, houses, barns, and equipment sheds exist? If so, evaluate the condition and size of any such structures on the property. Are electricity and running water available? If running water is available, is it safe for cooking and drinking? Is garbage disposal available on/off site?
- ✓ Adjacent land use. Are lands/land ownerships that border the property managed to be compatible with developing a natural resource enterprise?
- ✓ Supplies, vehicles, equipment, and machinery you own. Include the size, working condition, age, and purchase price, if possible, of all vehicles, equipment, and machinery.
- ✓ Identify potential risks to users, such as an uncovered well opening, dead trees near roads or property boundaries, old mine sites, or any unsafe structures.
- ✓ Wildlife populations. If the enterprise depends on wildlife or fisheries resources, you should determine the quantity and quality of the animal populations, both resident and migratory, if appropriate. For resident native species such as white-tailed deer or wild turkey, and for fisheries resources in ponds or lakes, you may have to get a biologist to estimate the initial population status as well as provide information on harvest and potential for hunter success. Migratory populations,

such as waterfowl, may vary greatly from season to season because of suitable habitat availability, migration patterns, and other conditions you can not control. For species such as white-tailed deer, age structure and sex ratio estimations may be important, particularly if you want to manage for trophy quality deer.

After completing the physical inventory, you can evaluate what type of business enterprise might be best suited to your available resource base and will be compatible with other ongoing operations, such as agriculture or forest management operations. There are likely to be some tradeoffs you must consider. You can share the information in the physical inventory with an Extension specialist or other professionals who can help identify advantages or disadvantages when selecting an enterprise. *It is critical to the success of any venture that the available resources can support the proposed enterprises before you try to determine the potential for return.*

## ■ Labor Resources Inventory

An inventory of labor resources will include both management and general labor needs.

- ✓ How many employees will the enterprise require to operate effectively and efficiently?
- ✓ What types of employees are needed?
- ✓ What current labor laws apply to your operation?
- ✓ Will the enterprise require manual labor, such as for landscape maintenance?
- ✓ Will it require customized personal service, such as guided hunts or tours?
- ✓ What about other operational needs like managerial, clerical, and bookkeeping skills?
- ✓ What is the labor supply in the area where the business will operate?
- ✓ What is the competitive rate of pay, including benefits, in the area?
- ✓ What other businesses in the area may compete for the labor supply or your client base?
- ✓ Don't forget to consider and include the value of your time and labor, as well as that of other

family members, if appropriate, who will be involved in operating and managing the enterprise.

### ■ *Financial Resources Inventory*

The financial resources inventory should consider the available capital as well as all outstanding loans for assets identified in the physical resources inventory. You must consider opportunity costs. These costs are identified as revenue you might have received if crops, timber or livestock had been managed for maximum production instead of the new enterprise. You may also have input costs, which might not be the same for the alternative enterprise. You must also assess risks costs. For some alternative enterprises involving access for recreational use, you must think about the additional costs of appropriate liability insurance coverage. The exercise of developing this and other listed resource inventories should create a base of information that will help develop the overall business plan.

## BUSINESS PLAN

An introductory section should explain and describe the type of enterprise you are proposing.

- ✓ Include a summary of why you are considering the enterprise and the history behind the creation of it
- ✓ Develop a mission statement for the enterprise and include it in this section.
- ✓ List clear and concise objectives that can be measured to evaluate the progress and success of the plan.
- ✓ Develop a timetable for accomplishing specific objectives identified.
- ✓ Include general information about the demand for the products, services, or access associated with the enterprise.
- ✓ Include information known about the growth of this type of enterprise statewide and nationally.

## MARKETING PLAN

No one should try to develop a natural resource-based enterprise without first identifying a market. The first part of the marketing plan is the market research.

- ✓ Identify several different possibilities for marketing the enterprise.
- ✓ Visit similar existing enterprises and talk with people in the business. You may even want to visit as a paying guest one of these similar enterprises to get a feel for both sides of the equation, both as an owner and as a guest.
- ✓ Read trade journals associated with the industry.
- ✓ Seek information from university Extension specialists and other agencies that work with the industry you are planning to enter.

Once you have the industry information, you should develop a plan of action to attract customers. Develop a plan to advertise and promote the enterprise. If you want to target people in your local area as clients, your advertising budget may be relatively inexpensive using local newspapers and magazines. However, if you want to attract regional or national clientele, the costs of advertisement will, of course, be higher. Advertising will be most effective once you determine the type of enterprise and have thought about how to describe and illustrate what you are offering potential clientele. What is unique about your enterprise, and what other attractions or amenities are in the area where your enterprise is located that would be of interest to people who would travel to visit your enterprise? Web sites are now a great way to advertise but will require consideration of what you can illustrate and communicate to potential clientele, what you have to offer, and how that information can be shared through a web site. Consider the following:

- ✓ What type of customer will the enterprise target?

- ✓ Will individuals or family units be targeted as primary customers?
- ✓ Is there a certain clientele characteristic unique to this business enterprise?
- ✓ What will the enterprise offer that makes it attractive to clients?
- ✓ Consider the population demographics of the potential clientele in the area.
- ✓ Is the local population base large enough to support the enterprise, and is it likely to be viewed positively or negatively by the local population, including neighbors?
- ✓ Does the enterprise need to focus on a regional or national basis?
- ✓ What other products, services, or activities can be offered clients?
- ✓ The enterprise may need to create package plans with other area businesses that benefit all involved. It may benefit the enterprise to team up with a regional transportation company, local motel, local processing facility, restaurant, or other appropriate businesses in the community.
- ✓ Use state tourism and economic development agencies to help promote the business.
- ✓ Many state agencies (some are listed at the back of this publication) provide assistance that may be of help to your enterprise at low cost or no direct cost.
- ✓ A number of private consultants are available in Mississippi and neighboring states who provide their services for a fee.

Pricing a service or experience offered to the public is critical in the marketing plan. Pricing will be unique to each enterprise. The first step in determining a profitable retail price is determining the total cost to the enterprise. It begins with understanding cost concepts. Total cost can be divided into two parts: variable and fixed costs. Fixed costs include items such as insurance, interest on invest-

ment, property taxes, depreciation of assets, and rent. These costs are referred to as “fixed” because they are set and do not change over a given time period. Variable costs are those direct operating costs that change with the quality of the operation and the quantity of production or services rendered. Variable costs include things like labor, supplies, utilities, marketing, and the range of amenities you provide to your clientele.

The second step is determining the actual price of what to charge for the product, service, or access to the enterprises that will be provided. The cost analysis you conduct will be useful in setting prices. Prices may be determined on “break-even” plus 10 or 20 percent, what similar enterprise competitors prices are, what the market can bear, or other objectives.

## OPERATING PLAN

This section of the business plan details what the enterprise provides.

- ✓ Describe a normal working day for the enterprise.
- ✓ Provide a physical address for the enterprise.
- ✓ Tell where the enterprise is located and the most direct way to get to it.
- ✓ Give a mailing address if different from the physical address.
- ✓ Include telephone and fax numbers.
- ✓ Identify by name, who the contact person(s) will be.
- ✓ Provide by e-mail or web site, if available.

Remember that for most natural resource-based enterprises, and especially those that involve people’s spending extended time at your facilities or on your land, service to the customer is the key to repeat business. Developing your enterprise to provide a quality experience for customers will also be a significant benefit to your marketing success. A good quality experience will create a positive

impression on customers that will encourage repeat business and their personal recommendations to other potential customers. Word-of-mouth advertisement is the best return you can expect on your investment.

## ORGANIZATIONAL PLAN

Based on the inventory list you developed and the previous information on labor availability, develop an organization chart showing the chain of command for operating the enterprise. Describe the duties and responsibilities of each employee. Include resumes for the management team and owners. Be sure to include any special training, experience, or education employees need to have that make them specifically beneficial to the enterprise. Also be sure to consider what employee benefits will be provided.

## FINANCIAL PLAN

The financial plan must consider budgeting of the enterprise. Budgeting is the tool the business manager uses to identify costs. A budget is a plan that helps the manager identify all costs associated with the enterprise, even costs you might otherwise overlook. A budget lets you compare forecasted and actual results of putting the plan to work. A realistic budget that includes the total costs of operating the enterprise will help determine a feasible pricing schedule for the products, services, or access that are to be provided, and it will help determine an appropriate marketing strategy.

The financial plan has four parts: a statement of sources and uses, a profit and loss statement, a cash flow statement, and a balance sheet.

- ✓ The sources and uses statement lists available funds and where they will come from, whether they are owner's funds, investors funds, or if they come from lending agencies. It also lists all the uses for the funds, such as for land, equipment, machinery, blinds, stands, and renovations or inventory. In other words, it includes anything you will purchase for the

enterprise from start-up funds.

- ✓ The profit and loss statement is the estimated income from the enterprise operations and all the related expenses involved in doing business. It must be directly coordinated with the proposed budget. It shows total income less total expenses, of the enterprise, and the bottom line, which is either an income or a loss for a fixed period of time (usually one year).
- ✓ The statement of cash flow is generally developed on a monthly basis, usually for a year, and shows only cash receipts and cash outflows for each month. The statement of cash flow is a tool that helps management and lenders understand how and when cash flows into and out of the enterprise. It can help management identify when funds are needed and how to schedule debt repayment. It is an extremely useful management tool for highly seasonal enterprises.
- ✓ The balance sheet lists enterprise assets, liabilities, and owner equity. It is a snapshot of the health of the enterprise on a given day. It indicates what the enterprise owns and the debt structure of the business.
- ✓ Consult your tax and/or financial planning advisor about your enterprise development plan.
- ✓ Consult with your attorney to be sure he or she understands what your operation is going to do and if there are any legal ramifications you have not considered.

The financial plan helps identify the economic feasibility of the proposed business enterprise and provides the financial tools to better manage the operation.

The following checklist is a good place to start if you are considering starting a business/enterprise in Mississippi:

- ✓ Request a Mississippi Entrepreneur's Tool Kit from the Mississippi Development Authority [www.mississippi.org](http://www.mississippi.org) (601/359-3593), or access it electronically through the Mississippi State University Extension Service web site at [www.msucare.com](http://www.msucare.com).
- ✓ Request a copy of Mississippi Reporting

Requirements for Small Businesses from the Mississippi Development Authority [www.mississippi.org](http://www.mississippi.org) (601/359-3593), or access it electronically through the Mississippi State University Extension Service web site at [www.msucare.com](http://www.msucare.com).

- ✓ Choose a name and logo, if you want one, for the enterprise. To protect the name and logo, complete an Application To Register a Trademark. You can get one of these from the Mississippi Secretary of State (601/359-1633) or online at [www.sos.state.ms.us](http://www.sos.state.ms.us).
- ✓ Decide on the form of business ownership (sole proprietorship, partnership, or corporation). In order to be incorporated, you must file an articles of incorporation with the Mississippi Secretary of State (601/359-1633). Register with the Mississippi Secretary of State if the enterprise is a limited liability company (LLC).
- ✓ Obtain a local business permit or privilege license from city/county officials.
- ✓ Obtain any special licenses and permits some enterprises may require. You may need to meet additional regulations, as well (example: ventures that handle or process food). Contact the Mississippi Secretary of State for information (601/359-1633).
- ✓ Contact the IRS online at [www.irs.ustreas.gov](http://www.irs.ustreas.gov) to obtain a federal employer identification number or EIN (call 800/829-3676 and request FORM SS-4). An EIN is required for all partnerships, corporations, and sole proprietorships with one employee or more.
- ✓ Complete a Mississippi Business Registration Application (FORM 70-001-00-1). You can get one of these from the Mississippi State Tax Commission (601/923-7000) or online at [www.mstc.state.ms.us](http://www.mstc.state.ms.us).
- ✓ Purchase workers' compensation insurance. This is required if you will have five or more employees. [www.mwcc.state.ms.us](http://www.mwcc.state.ms.us)
- ✓ Open a DBA (doing business as) bank account for the enterprise.
- ✓ Check on needed insurance and/or bonding coverage for the enterprise.

- ✓ Write and use a business plan for the enterprise.
- ✓ Secure financing, if needed.
- ✓ Establish prices, fees, and enterprise operation policies.
- ✓ Obtain copies of IRS publication 334 (Tax Guide for Small Business) and IRS publication 533 (Self-Employment Tax). Contact the IRS at 800/829-3676 or electronically at [www.irs.ustreas.gov](http://www.irs.ustreas.gov)
- ✓ Determine record keeping requirements and set up a bookkeeping system.
- ✓ Obtain an answering machine and/or a phone/fax line for business.
- ✓ Obtain business cards, stationery, forms, and such.
- ✓ Do advertising and publicity.
- ✓ Start the enterprise!

You may get additional information for Mississippi business/enterprises through the Mississippi State University Extension Service Food and Fiber Center or Business Briefs web site at [www.msucare.com](http://www.msucare.com)





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## CHECKLIST FOR STARTING A SMALL BUSINESS IN MISSISSIPPI

There are many issues to consider when you are thinking about starting a new business. Once the decision has been made to start a small business, use the following checklist as a guide as you go through the planning process in Mississippi:



- Request a Mississippi Entrepreneur's Tool Kit from the Mississippi Development Authority (601/359-3593), or access it electronically through the Mississippi State University Extension Service Web site.
- Request a copy of Mississippi Reporting Requirements for Small Businesses from the Mississippi Development Authority (601/359-3593), or access it electronically through the Mississippi State University Extension Service Web site.
- Check local zoning regulations with city/county officials. When applicable (such as a home-based business) also check neighborhood covenants.
- Choose a name (and logo, if desired) for the business. To protect the name and logo in Mississippi, complete an Application To Register a Trade Mark (form F0023), which can be obtained from the Mississippi Secretary of State by calling 601/359-1633 or Online at [www.sos.state.ms.us](http://www.sos.state.ms.us). Federal trademark registrations are handled by the U.S. Patent and Trademark Office. For additional information and an application form, call the U.S. Patent and Trademark Office at 800/786-9199 or Online at [www.uspto.gov](http://www.uspto.gov).
- Decide on the form of business ownership (sole proprietorship, partnership, or corporation). In order to be incorporated, articles of incorporation must be filed with the Mississippi Secretary of State (601/359-1633 or [www.sos.state.ms.us](http://www.sos.state.ms.us)). Register with the Mississippi Secretary of State if the business is a limited liability company (LLC).
- Obtain a local business permit or privilege license from city/county officials.
- Obtain any special licenses and permits that some businesses may require. You may need to meet additional regulations, as well (examples: ventures that handle or process food; child care centers). Contact the Mississippi Secretary of State for information at 601/359-1633 or [www.sos.state.ms.us](http://www.sos.state.ms.us).
- Contact the IRS to obtain a federal employer identification number or EIN (call 800/829-3676 and request FORM SS-4 or go Online at [www.irs.gov](http://www.irs.gov)). An EIN is required for all businesses with one employee or more.
- Complete a Mississippi Business Registration Application (FORM 70-001-00-1), which can be obtained from the Mississippi State Tax Commission (601/923-7000).
- Purchase workers' compensation insurance (required if you have five or more employees.)
- Open a DBA (doing business as) bank account for the business.
- Check on needed insurance and/or bonding coverage for business. (Note: Many homeowners' policies usually will not cover home-based businesses.)
- Write a business plan.

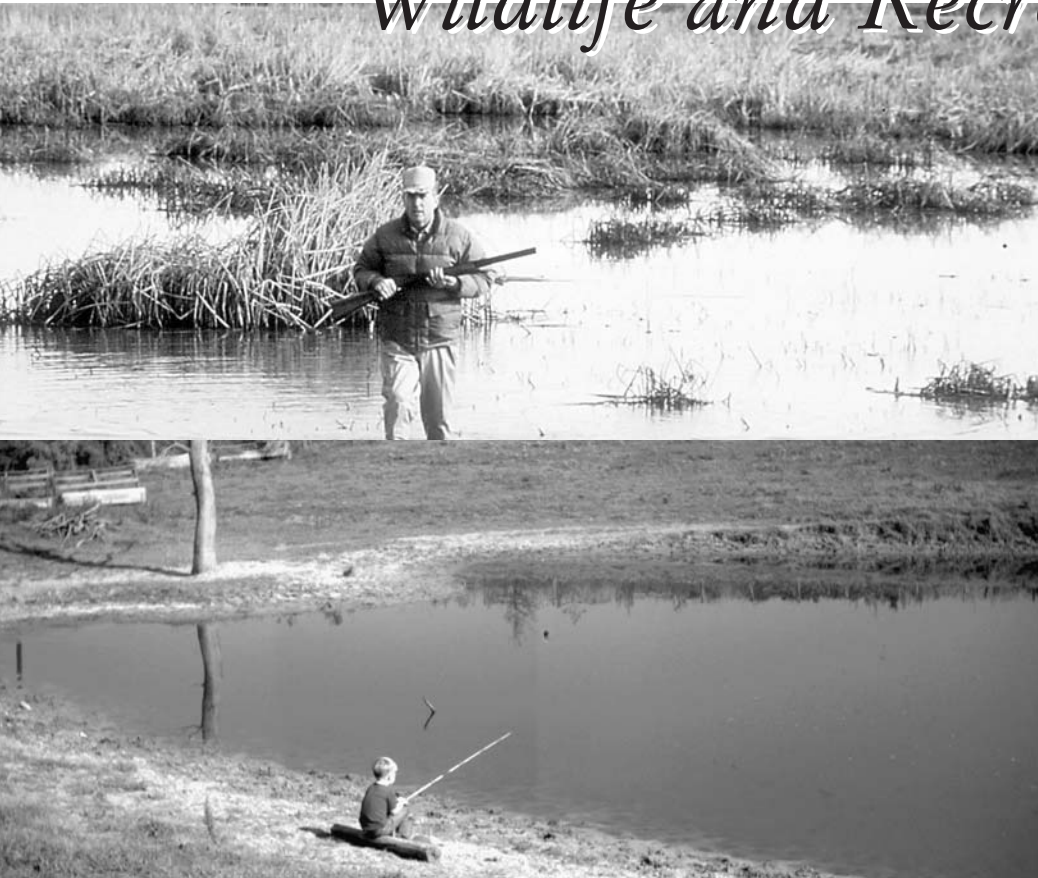
- Secure financing, if needed.
- Establish prices, fees, and business operation policies.
- Obtain copies of IRS publication 334 (Tax Guide for Small Business), IRS publication 533 (Self-Employment Tax), and if business is home-based IRS publication 587 (Business Use of Your Home) by calling the IRS at 800/829-3676 or electronically at [www.irs.gov](http://www.irs.gov).
- Determine record keeping requirements and set up a bookkeeping system.
- If business is home-based, set up a work area in home and obtain an answering machine and/or a phone line for business.
- Obtain business cards, stationery, forms, etc.
- Do advertising and publicity.
- Start the business!

Additional information for Mississippi small businesses may be accessed electronically through the Mississippi State University Extension Service at [www.msucares.com/business\\_assistance/homebusiness/index.html#pubs](http://www.msucares.com/business_assistance/homebusiness/index.html#pubs).

This document was produced by the MSU-ES Food and Fiber Center and is available on [MSUCares.com](http://MSUCares.com)

# NATURAL RESOURCE ENTERPRISES

## *Wildlife and Recreation*



## A CHECKLIST OF CONSIDERATIONS FOR LANDOWNERS

Many private landowners are interested in how to begin a natural resource-based enterprise on their lands. This interest is in response to the general public's increased desire for natural resource-based products from private lands and/or access and use of private lands for recreational use.

According to national surveys, the public is not only interested in obtaining access for products and recreational pursuits, they are willing to pay for this access. As a result, many private landowners are evaluating their potential for providing such products or for offering such activities on their lands. However,

landowners are struggling with some serious land-use management decisions.

This checklist and accompanying explanations should be helpful to landowners in making decisions before they initiate and make investments in such an enterprise. This checklist is not all-inclusive; however, it does discuss some serious issues that should be evaluated before starting any type of natural resource-based enterprise. A sample worksheet is also provided for landowners to use in evaluating individual and family goals and objectives for considering a new natural resource-based enterprise.

## CONSIDERATION CHECKLIST

The first consideration in planning for a natural resource-based enterprise is the development of a NATURAL RESOURCE INVENTORY, *including facilities that are pertinent to the enterprise*. This information is essential in determining the best use of existing resources and facilities. It will be useful in determining the type of enterprise(s) your lands and waters are best suited for, and the various options that can be provided or offered.

### ■ *Natural Resource Inventory*

- ✓ What type of land do you have? Is it predominantly flat, hilly, open, forested, pastureland, currently in agricultural production, etc.?
- ✓ How much of the land acreage is in different types? For example, if your enterprise is hunting leases, how much land is in woodlands that provide quality habitat for deer and turkey, or how much is in wetlands that provide quality habitat for waterfowl?
- ✓ Is this land already owned, or is some of it rented or leased?
- ✓ Do you have an aerial photo or map of the land showing roads, access points, and portions that are fenced? Are property boundaries clearly defined?
- ✓ Is it gated or on a private road?
- ✓ What type of land use is on adjacent/surrounding property owned by neighbors or other ownership, such as corporate, state, or federal owners?
- ✓ Are there ponds, lakes, or streams on your property, and if so, how many, and of what amount? Example: ( 2 lakes, 3 ponds, totaling 50 acres, and  $\frac{3}{4}$  mile of permanent or intermittent streams.)
- ✓ What kind of buildings are on the property? What size are they, and what kind of condition are they in? Can you provide lodging, dining space, cooking and restroom facilities with the existing structures? Are they restorable for use by guests?

✓ Do you have some idea of the populations of major wildlife species residing on your lands, and are your ponds and lakes stocked and managed for fishing?

✓ Do your long-term objectives for your property and its management include adding and sustaining this natural resource-based enterprise as an integral part of the operation?

### ■ *Compatibility*

- ✓ Does your current use of your land's natural resources for farming, forest management, or livestock grazing lend itself to being used for other purposes?
- ✓ If so, are such other uses compatible with recreational use by paying-clients without conflicts or compromises to the integrity of your major income-producing operation? For example, if your major use of the property is an agricultural operation, can you tolerate a hunting operation during your planting or harvest season without having a conflict in time and resource management?
- ✓ Is your labor force (family or existing employees) sufficient to handle additional work, and will the new enterprise conflict with or complement normal down times in the work load? For example, will someone be available to guide or direct clients to hunting places or provide lodging and food for them, if needed, during the hunting season, or is that a busy time or vacation time for you, your family, and employees?

### ■ *Liability Insurance*

Insurance is a contract where an insurer (insurance company) undertakes to indemnify the insured (person or family owning the insurance) against loss, damage, or liability arising from an unknown or contingent event. The insured pays the insurer a premium for this coverage.

Liability insurance covers loss caused by negligence but not loss caused by a willful act of the insured. Negligence is one of the conditions that can be greatly reduced on most private lands

through risk planning. Anyone who allows public use of their lands for recreational use, whether or not a fee is charged for access and/or use of the property, should consider acquiring sufficient liability insurance coverage. Liability insurance companies generally limit the total liability of the insurance company to a specific sum per occurrence, which may be much less than the liability incurred by the insured, but it does reduce the risk of loss.

If you already have insurance on your property, you can work with your present insurer to see if a rider can be added as a supplement to your existing policy to obtain adequate liability coverage. Others who plan to lease their land to an individual or group may require the lessee(s) to obtain liability insurance as a part of their written lease agreement. There are a number of insurance companies who offer a rider for coverage of public recreational use, or for hunting clubs. If you have questions about the need for liability insurance for the type of natural-resource enterprise you are considering, you may want to consult your attorney.

### ■ *Resource Sustainability*

- ✓ Can you sustain your existing operation and still add some type of recreational access opportunity such as deer hunting?
- ✓ Can you sustain and/or enhance a productive deer population over time that clients are willing to pay for, or will such exploitation on the existing land base be unsustainable given the limited amount of deer habitat?
- ✓ Can you allow a certain number of fishing days on your ponds or lakes and still be able to provide quality fishing in the years to come by limiting use and ensuring maintenance of good harvest records, or will you have to drain and restock periodically?

### ■ *Personal and Family Inventory/Assessment*

After the NATURAL RESOURCE INVENTORY, this assessment may be the most important consideration that should be evaluated:

- ✓ Will you and/or members of your family or employees enjoy dealing with people who will

be using your land and having access to your natural resources?

- ✓ Do your and your family's long-term objectives for ownership require adding an alternative enterprise to your existing operation for increased or more dependable annual income?
- ✓ Do you and/or members of your family or existing employees have some practical experience or knowledge about the type of enterprise you are considering?
- ✓ Are you and your family or employees willing to keep records and manage the business aspects of the new enterprise?
- ✓ Are you and your family willing to take the risks associated with investing in the management and operation of a new enterprise?

### ■ *Other Options for Consideration*

- ✓ Will the enterprise be seasonal or operated year-round?
- ✓ Can the existing natural resources be enhanced to meet the needs and demands of the client base for the enterprise, and can they be sustained for future needs?
- ✓ Will the enterprise offer consumptive use of the resources, such as hunting and fishing, or so-called nonconsumptive uses, such as horse riding, bird watching, or both?
- ✓ Will the enterprise offer primarily land-based activities, water-based, or both?
- ✓ Will the enterprise be compatible with the other existing operation(s)?
- ✓ Can the enterprise be operated with existing resources, or will investments, loans, and additional labor be necessary?

## MARKETING

The considerations listed above should be evaluated and answered before moving forward. To this point, no major investments or risks have been incurred. However, before a decision is made to initiate one or more alternative natural resource-based

enterprises, you must consider the market and client base. Marketing the product, service, or access for recreational use is essential to consider if the enterprise is to be successful.

One way to get some idea of the market for the enterprise is to visit an operation that offers similar kinds of products, services, or recreational access, and talk to the people who manage and operate this business. If you know of trade associations who work with such enterprises, talk to their representatives and review materials they have available that relate to the enterprise you are considering. Attend available educational programs that relate to the type of operation you are considering. Learn as much as possible about such enterprises and their operation and management as you consider whether, in fact, this is an appropriate business for you and your family.

### ■ *Marketing Your Natural Resource-Based Enterprise*

- ✓ Develop a customer/client profile.
- ✓ Do you want to market to corporations or groups?
  - ✓ To individuals or families?
  - ✓ To certain income levels?
  - ✓ To certain age groups?
  - ✓ To the diverse public at large?
  - ✓ To urban clientele or to local people in nearby communities?

### ■ *Location*

- ✓ Is your land near major metropolitan areas or population centers?
- ✓ Are there similar operations nearby that you will be competing with, or are there other types of operations nearby that are complementary and may provide clients for your business?
- ✓ Does your enterprise or some other attraction nearby offer something unique that may be a draw for regional or national clientele?

### ■ *Accessibility*

- ✓ Is your location accessible to clients? For example, is your enterprise on or near a major highway system?
- ✓ Do you have a good road system to access your property and enterprise by automobile, or is it accessible only by 4-wheel truck or all terrain vehicle?
- ✓ Is your enterprise within 60-80 miles of a major airport or even a private airport?
- ✓ Can you provide transportation to your enterprise from the nearest airport for clients who would fly in to visit your operation?

### ■ *Potential Partners and Cooperators*

- ✓ State, regional, and local tourism agencies
- ✓ Trade or industry associations or groups
- ✓ Local and State Chambers of Commerce
- ✓ State and local economic development agencies or groups
- ✓ Nearby tourism businesses/operations
- ✓ Corporate trade or industry publications
- ✓ Youth associations and organizations, such as Boy Scouts, 4-H, or Campfire Girls
- ✓ Senior citizen organizations, such as AARP
- ✓ Community groups, school groups, and others

## PLANNING

Following this thought process of things to consider and do, if the potential looks promising for developing your enterprise, now is the time to develop a written business plan and begin to realistically weigh the pros and cons of the investments (labor and capital) that will be necessary to operate the enterprise. This necessary step will help in weighing the costs of doing business against the potential market demand, and help in determining the feasibility of the enterprise, the time

required to get the business up and running, and the amount of time it will take to make the operation profitable and to become an integral part of your total operation.

### ■ *Business Plan Outline*

- ✓ Introduction and 3- to 5-year plan for the enterprise
- ✓ Organizational plan
- ✓ Marketing plan
- ✓ Operating plan
- ✓ Financial plan, including feasibility perspective
- ✓ Evaluation and monitoring plan

### SUMMARY

Although this checklist of considerations appears to require extensive study before making final decisions about start-up of a new alternative enterprise, it will be in your best interest, as well as your fami-

ly's best interest, to do so. There is no "silver bullet" or "one plan fits all" for initiating a natural resource-based enterprise. Each individual site/location has different capabilities biologically, socially, and economically, just as each landowner is different and has different interests, capabilities, and objectives for developing a natural resource-based enterprise.

Therefore, this checklist should be useful for any individual, family, or group who is thinking about diversifying and initiating a new alternative natural resource-based enterprise, or expanding their existing operation to include such an enterprise.

Once the type of enterprise is determined and a business plan is being developed, another suggestion is to make two lists. First, list the realistic short-term objectives, (1-3 years). Second, list the projected long-term objectives for this enterprise (3-7 years) and be as specific as possible. These lists can be modified as the enterprise moves forward, but should serve as good benchmarks for enterprise evaluation.



Photograph by *Glen "Tink" Smith*





4. How compatible do you think a new sustainable natural resource-based enterprise will be with whatever goals you listed above for your existing operation?

Very compatible - explain \_\_\_\_\_

Likely to require tradeoffs, identify \_\_\_\_\_

Not compatible, explain \_\_\_\_\_

5. What role will this new enterprise play in the next 1 to 3 years in terms of annual income and employment? Check one or more of the following:

Provide supplementary income to existing operation, or off-farm income

Replace part of your existing operation

Completely replace existing operation and off-farm income

Other roles/tradeoffs

6. After the new enterprise is established, what amount of family living income would you like the following sources to contribute annually? (present dollars)

Current farm or forestry operation \_\_\_\_\_

New enterprise \_\_\_\_\_

Off-farm employment \_\_\_\_\_

Other \_\_\_\_\_

Total \_\_\_\_\_

7. What special features do you and your family desire and/or expect the new enterprise to provide? (Level of risk, labor requirements, seasonality, use of special skills or resources, total management and use, sustainability of the integrated operation, etc.)



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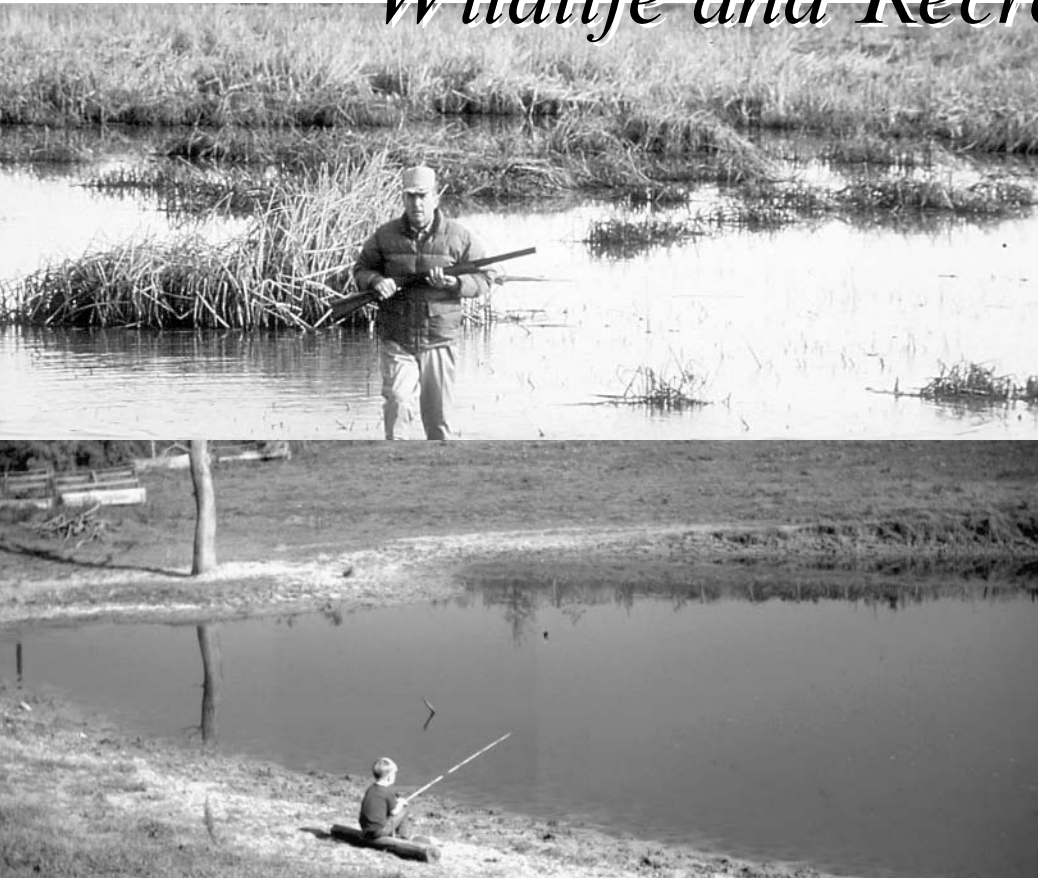
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# NATURAL RESOURCE ENTERPRISES

## *Wildlife and Recreation*



## FINANCING YOUR NATURAL RESOURCE-BASED ENTERPRISE

**W**ildlife, fisheries, and other natural resource-based recreational pursuits constitute America's newest billion-dollar industry. In 2001, expenditures on wildlife-related recreation in the United States were estimated at \$108 billion. Expenditures on wildlife, fisheries, and related outdoor recreation exceeded \$974 million in Mississippi alone in 2001. Mississippi is uniquely positioned to receive a wealth of economic benefits as a result of the increasing public interest in and demand for access to wildlife, fisheries, and outdoor recreation.

Starting a business is hard work, and you must conduct a large amount of research to be sure that

you want to get involved in this venture and to ensure that you will be successful in it. You must consider and address issues like tax laws, state and federal laws and regulations, liability issues, and safety issues before you approach a lender.

If you are already a landowner and have sufficient capital available for the development of an enterprise, there is little need to seek financing. If, on the other hand, you desire to establish and sustain a wildlife- or fisheries-related recreational enterprise and have limited funds or land available, financing is likely to be of utmost importance to you.

NATURAL RESOURCE ENTERPRISES

## FINDING A LENDER

If you conclude that financing your natural resource-based enterprise is a necessity, you will need to find out which lender will best serve your purposes. Several financing options are described below.

### *Commercial Banks*

Most borrowers contact their local commercial bank first. Unfortunately, in many cases a commercial bank is only interested in short-term loans, so you may need to look elsewhere for financing.

### *Farm Credit Lending Institutions*

- ✓ Federal Land Bank Associations  
([www.landbanksouth.com](http://www.landbanksouth.com),  
[www.mslandbank.com](http://www.mslandbank.com))
- ✓ First South Farm Credit  
([www.farmcreditsouth.com](http://www.farmcreditsouth.com))

The Farm Credit System, through its locally owned and operated cooperative lending operations, is a source of financing that offers long-term loans at competitive and attractive interest rates. Loans through the Farm Credit System can be for the purpose of purchasing real estate, improving real estate, debt refinancing, and consolidation. Interest rates can be variable or fixed with monthly, quarterly, semi-annual, or annual payments. Also, the Farm Credit institutions have “young,” “beginning,” and “small farmer” programs with several attractive features for those that qualify.

### *Farm Service Agency*

([www.fsa.usda.gov](http://www.fsa.usda.gov))

The Farm Service Agency (FSA) is a part of the United States Department of Agriculture (USDA). The FSA makes and services both direct land ownership and operating loans. FSA also has a guaranteed loan program and a participation loan program. FSA guaranteed loans provide conventional lenders with up to a 95 percent guarantee of the principal loan amount. In the participation loan program, FSA lends up to 50 percent of the amount financed and the conventional lender provides the other 50 percent.

### *Mississippi Development Authority*

([www.mississippi.org](http://www.mississippi.org))

Mississippi Development Authority (MDA) makes interest-free loans to eligible start-up operations. MDA funds up to 20 percent (or \$200,000 — whichever is less) of the cost to construct or update facilities interest-free for up to 15 years. The conventional lender guarantees this loan and MDA is assured of repayment.

### *Owner Financing/Family Members/Investors*

Owner financing may be an option to consider when a seller is interested in the sustainability of the property and is willing to finance the sale. Interested investors may also want to finance a natural resource-based enterprise if they expect a fair return on their investment and/or use of the enterprise once the operation is up and running. A family member with money to invest and confidence in the ability of the borrower to repay may also be willing to extend a loan.

## WHAT LENDERS NEED

### *The Five Cs of Credit*

All commercial lenders look for the same basic characteristics in a borrower. They are known as the “Five Cs of Credit”:

- Character - Personal credibility of the borrower,
- Capital - Financial position and progress toward financial stability,
- Capacity - Ability to repay the loan,
- Collateral - Other property or capital to secure the loan,
- Conditions - Basis of ultimate loan approval.

### *Business Plan*

The most important information required by a lender is an up-to-date, complete, and accurate business plan. There are several good business plan models on the World Wide Web that can assist you in developing a sound business plan. A few sites available for this purpose include:

- ✓ [www.bplans.com/sp/](http://www.bplans.com/sp/)
- ✓ [www.mississippi.org](http://www.mississippi.org). This comprehensive web site was created by the Mississippi

Development Authority, whose principle purpose is economic development. At this site, the “Entrepreneur's Tool Kit” found under the Business Development section is very useful, containing a detailed explanation and example of each area of the financial plan, as well as a universally accepted personal financial statement.

(Note: Because web links can change, if you have trouble locating any of the links provided in this publication, please refer to the appendix on page 4 which gives the mailing address and phone number for each organization.)

Within the larger business plan, lenders will look for a sound and detailed financial plan. Critical components of a financial plan are:

- ✓ A cash-flow statement,
- ✓ Sources and uses of funds,
- ✓ Income statement,
- ✓ Balance sheet.

When you approach a lender, it is important to establish a personal relationship with a loan officer who understands a borrower's needs. It is the loan officer's job to assess the borrower's credit quality, or the “Five Cs of Credit,” to understand strengths and weaknesses of the business plan, and, if they have experience with natural resource-based enterprises, to offer sound advice on plans and goals of such an enterprise. It is a good idea to call ahead and find out what information the loan officer will need as they consider an application for loan. Be prepared to answer questions and give all information as required by the lender.

### *Inventory*

A lender will also be very interested in reviewing an inventory of your physical resources and labor resources. This inventory includes:

- ✓ Number of acres in the enterprise
- ✓ Unique physical, biological, or landscape features

- ✓ Water resources availability
- ✓ Type and extent of vegetative cover
- ✓ Current land use (crop, pasture, timber)
- ✓ Other comparable enterprises in the area (competition)
- ✓ Adjacent land use and management history (if known)
- ✓ Supplies, vehicles, equipment owned or needed
- ✓ Potential risks (environmental hazards, unsafe structures)
- ✓ Status of existing wildlife and fisheries populations
- ✓ Number of employees on hand or that will be needed
- ✓ Employee special expertise needed
- ✓ Level of employee compensation (base pay, benefits)
- ✓ Need for customized services (guided hunts, tours)
- ✓ Opportunities for expansion

Financing a natural resource-based enterprise does not have to be a frightening or cumbersome process. Be sure to have a sound, complete, and comprehensive business plan, and be prepared to answer any and all questions about your enterprise. It is the loan officer's job to evaluate credit quality and to determine what, if any, special programs are available to make your plan work. Consider the lender as a partner, ask pertinent questions, draw on their financial expertise, and heed their advice.

## APPENDIX

### *Bplans.com*

www.bplans.com/sp/  
144 E. 14th Ave.  
Eugene, OR 97401  
Phone: (541) 683-6162  
Fax: (541) 683-6250

### *Mississippi Development Authority*

www.mississippi.org  
501 North West Street  
P.O. Box 849  
Jackson, MS 39201  
Phone: (601) 359-3449  
Fax: (601) 359-2832

### *Federal Land Bank Association of South Mississippi*

www.landbanksouth.com  
500 Greymont Ave., Suite D  
Jackson, MS 39202-3446  
Phone: (601) 355-8500  
Fax: (601) 355-8511

### *Land Bank of North Mississippi*

www.mslandbank.com  
P.O. Box 667  
Senatobia, MS 38668-0667  
Phone: (662) 562-9664  
Fax: (662) 562-7783

### *First South Farm Credit*

www.firstsouthfarmcredit.com  
P.O. Box 1709  
Ridgeland, MS 39158  
Phone: (800) 955-1722  
Fax: (601) 977-8368

### *Farm Service Agency, Mississippi Office*

www.fsa.usda.gov  
P.O. Box 14995  
Jackson, MS 39236  
Phone: (601) 965-4300  
Fax: (601) 965-4184



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By **Harry Dendy**, Natural Resources Associate, **James E. Miller**, Extension Outreach/Research Professor, Department of Wildlife and Fisheries, and **Kenneth W. Hood**, Extension Professor/Food and Fiber Center, Mississippi State University.

This publication is sixth in the series *Natural Resource Enterprises: Wildlife and Recreation*.

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# Cost-Share Programs



# Making Federal Farm Programs Work for You

by Wes and Leslie Burger

As a society, and as individuals, we think of sustainable wildlife populations as an integral component of a healthy environment. We value our encounters with wildlife of all kinds. Whether the sound of rushing wings in a covey rise, the twitter of songbirds about a backyard feeder, or frogs croaking from quiet backwater, all have intrinsic value that is worth protecting. However, as urban areas expand and production demands increase, remaining rural areas face additional pressure to meet commodity, financial, environmental, and recreational demands. Increasingly, the future viability of the environment in the U.S. is inextricably linked to land use decisions by private landowners. A recent study of motivations of non-industrial forest landowners in the Southeast reported that nature/aesthetics, family, and recreational opportunities were among the primary values of ownership. Economic returns, although important, ranked number 6 behind these more intangible values. Yet only 3% of landowners had a written management plan that prescribed how they intended to achieve their conservation objectives.

Conservation planning is becoming more complex as producers, land owners, government agencies, industry, and conservationists work to implement cost-effective production systems that meet landowner and world demands, compete in global markets, and yet maintain the integrity of natural ecosystems. This process is further complicated by the realization that the health of local wildlife populations and ecosystems is not only influenced by local environmental conditions, but also by conditions of the landscape at larger scales (such as watershed or regional levels).

In recognition of these complex and seemingly competing factors, the Natural Resources Conservation Service's (NRCS) Watershed Science and Wildlife Habitat Management Institutes recently published *Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat, Part 190* National Biological Handbook (<http://www.wsi.nrcs.usda.gov/products/tools.html>).

The NRCS, an agency within the United States Department of Agriculture (USDA), provides assistance to private landowners who voluntarily participate in federal conservation programs. The Corridor Manual gives an overview of the principles of landscape ecology and shows how these principles can be applied to planning at watershed and larger scales.

Ultimately, the success of area-wide conservation planning is a function of the success of conservation planning and implementation at the farm or property level. However, many landowners do not have a clear vision of their land management objectives or the practices and financial means by which they will achieve these objectives. Federal farmland conservation programs are an important vehicle for accomplishing conservation on private lands. Numerous studies have shown that lands enrolled in federal conservation programs, such as those administered by the USDA, can provide wildlife habitat and contribute to the stability or enhancement of some wildlife populations.



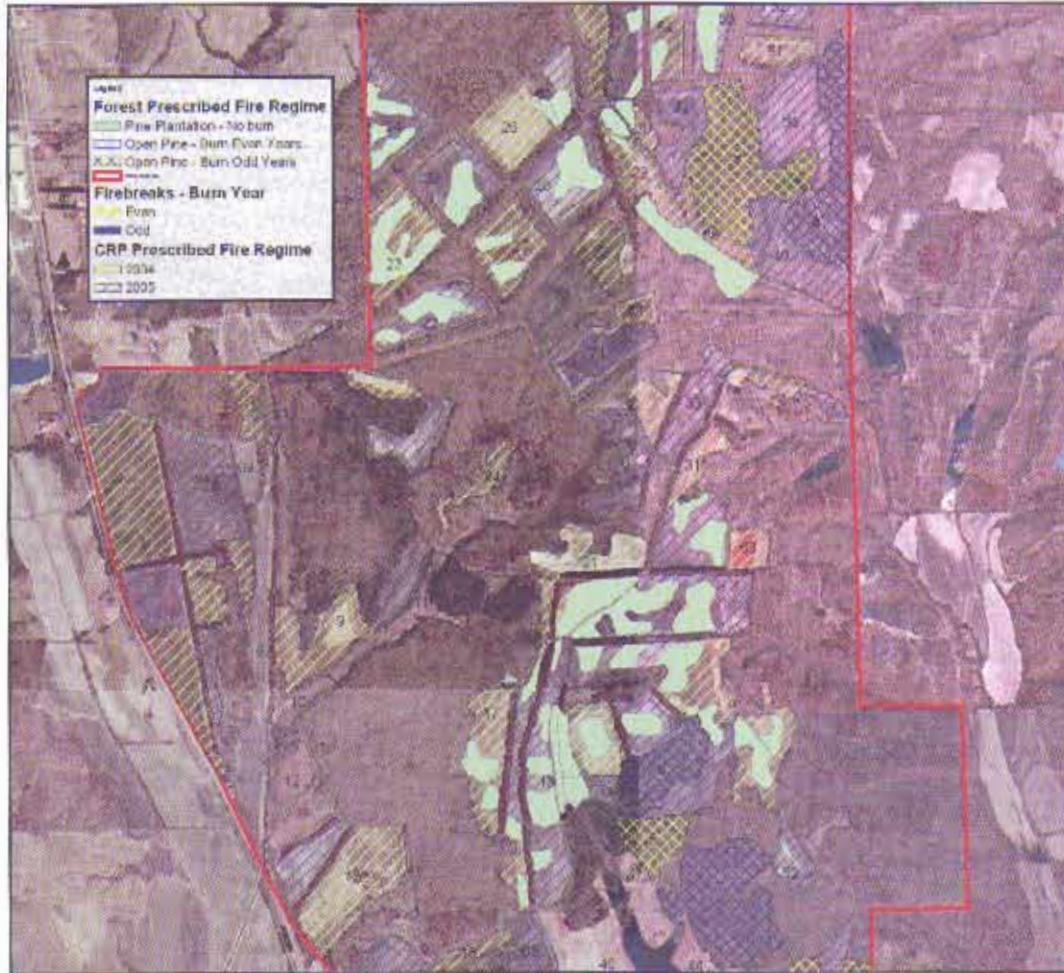
Annual mowing of grass CRP fields eliminates winter roosting cover and early season nesting cover and creates dense duff layer. Provides poor habitat for bobwhite.



Unmanaged grass CRP fields develop dense stands of grass with deep litter accumulation and little bare ground. Provides poor habitat for bobwhite.

However, despite the potential conservation benefits of programs such as the Conservation Reserve Program (CRP), millions of acres of CRP provide relatively poor wildlife habitat. This is often because the landowner did not have a vision of the wildlife habitat objectives they intended to accomplish with their program enrollment. Proverbs 29:18 says "Where there is no vision, the people perish." The same could be said of wildlife populations. Producing wildlife habitat through federal conservation programs requires a vision of desired outcomes.

The value of conservation program lands as wildlife habitat will vary with target animal species, the size and shape of the enrolled parcels, the cover crop selected, the land management regime employed, and the surrounding landscape. For example, in the Southeast



Management plan map illustrating prescribed fire regime on CRP grasslands and thinned mature pine stands. CRP prescribed fire cost-shared with CRP mid-contract management practices, mature pine prescribed fire cost-shared with WHIP.

today more than 980 thousand acres are enrolled in mid-rotation CRP pines (CP11). Many of these stands provide relatively poor wildlife habitat because they are densely stocked, closed canopy pine stands with dense accumulation of litter and no herbaceous ground cover. In short, they are unmanaged. Studies of CRP pine plantations in the Southeast have shown that active management, including thinning, selective herbicide, and prescribed burning, increases ground cover of grasses, forbs, and legumes, biomass of preferred deer forage, nutritional quality, and abundance and diversity of bird species, particularly regionally declin-

ing early successional species. In the Southeast, another 769 thousand acres are enrolled in CRP as either exotic forage grasses or existing grass (CP1 or CP10), much of which is fescue or Bermuda. Exotic forage grasses provide relatively poor habitat quality for grassland birds and lack of management results in dense grass-bound fields. Studies of CRP grasslands in Kentucky, Mississippi, and Missouri, have shown that eradication of exotic forage grasses and conversion to native grasses substantially enhances habitat quality for bobwhite. In the Southeast, even those CRP fields that are not planted to pine trees or forage grasses are seldom intentionally managed. This limits their wildlife habitat value. Studies in Kentucky, Mississippi, and Missouri have shown that on CRP fields without fescue or Bermuda grass, disking and prescribed fire improve wildlife habitat quality by reducing litter accumulation and increasing bare ground, abundance of legumes and seed-producing annuals, and insects. The point is, that simply enrolling land in a conservation program and establishing the prescribed cover does not equate to wildlife habitat. Careful selection of both a cover crop and management regime determine the quality of the wildlife habitat produced. Wildlife habitat does not happen by accident.

These landowners did not intentionally set out to create poor wildlife habitat, they just signed up for a program without much thought as to how it might affect their wildlife management objectives. For many private land-holdings, the management practices employed on their property are driven by the requirements of the specific conservation program in which the landowner enrolled. These practices may or may not meet the producers stated or unstated objectives for the property; they are simply required by the program in which he has elected to enroll.

### Objective-driven Planning Process

The USDA-NRCS National Planning Procedures Handbook (NPPH) and the Corridor Manual provide an alternative to this approach. This objective-driven approach is illustrated in a new planning product from the NRCS Wildlife Habitat



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Management Institute, called "Creating Early Successional Wildlife Habitat Through Federal Farm Programs" (<http://www.whmi.nrcs.usda.gov/technical/fieldborder.html>). Under this objective-driven approach, landowner objectives drive management



*Strip disking renovates dense sod-bound grassfields, creates bare ground, can stimulate germination of important annual weeds and legumes. Strip-disking is a cost-shared mid-contract management practice on CRP fields.*

practices, and management practices lead to conservation program selection, instead of program requirements driving management practices. In this scenario, the landowner's objectives for the property are clearly defined, the desired state of the landscape is visualized, the management practices required to produce this landscape are identified, and then the conservation programs under which these practices can be implemented are selected. Often, the necessary management practices can be accomplished under more than one government program, and in many cases, conservation practices from multiple programs are required to meet landowner objectives. Additionally, various programs differ in their eligibility requirements, cost share, incentive payments, or duration. This approach allows selection of programs that optimize both wildlife and economic objectives.

Clearly, this scenario is more involved than simply signing up for an appropriate conservation program and planting the required cover crop. However, this method has the additional benefits of providing quality wildlife habitat, improving overall local environmental quality, maximizing financial incentives as well as maintaining adequate commodity production.

The NPPH and the Corridor Handbook thoroughly describe a 9-step planning process (see side bar) that assists landowners in implementing objective-driven, rather than program-driven, management on their property. A brief summary of this process will be introduced here.

The process begins with meetings between the landowner and a natural resource professional to identify and document the resource problems and opportunities of the property under consideration (Step 1). If federal farm programs are involved the NRCS District Conservationist will be an essential resource professional. However, if wildlife is a landowner objective, a competent wildlife biologist should be involved early in the process. Additionally, in the Southeast, most wildlife management involves forested lands, therefore, a competent registered forester should provide input. The resource professionals help the landowner to identify their objectives. These objectives, including production and conservation concerns, are clearly outlined and recorded (Step 2). The next steps require gathering all necessary information (Step 3) and analyzing the current,

## **NRCS Planning Process**

### **Pre-planning**

- Identify conditions that triggered the planning process
- Collect materials and information needed for planning process

### **Phase 1. Collection and analysis at the conservation planning scale**

- Step 1. Identify problems and opportunities
- Step 2. Determine objectives
- Step 3. Inventory resources
- Step 4. Analyze resources

### **Phase 2. Decision support at the conservation planning scale**

- Step 5. Formulate alternatives
- Step 6. Evaluate alternatives
- Step 7. Make decisions

### **Phase 3. Application at the conservation planning scale**

- Step 8. Implement the plan
- Step 9. Evaluate the plan

baseline conditions of the area with respect to landowner objectives (Step 4). This process will include identifying the presence or distribution of wildlife species of interest, mapping existing plant communities and land use types, and inventorying those resources specifically related to the landowner's goals. Aerial imagery and Geographic Information Systems (GIS) are indispensable tools for this step. It is important at this stage that the resource professional have a good understanding of the basic habitat requirements of the focal species. To be effective, District Conservationists need an understanding of basic wildlife biology and wildlife biologists need an understanding of federal farm programs. Landowners may need to put together a team of resource professionals that bring the desired set of skills to the planning table. This baseline information is then used to make comparisons between existing conditions and potential future opportunities that might be accomplished through management (Step 5). These comparisons allow for formulating various alternative management regimes that address the landowner's objectives (Step 6).

The alternative management scenarios are evaluated individually to determine their ability to solve resource problems, meet the landowner's objectives, and provide financial compensation and incentive. Finally, a conservation management system is finally selected (Step 7), and the landowner should have adequate information and understanding to implement, operate and maintain the planned conservation system (Step 8). Periodic evaluations of the success of the plan, including ecological, economic, and social values, will need to be performed, and, if necessary, adaptations made to the plan.

### Case Study

Perhaps the best way to illustrate the methodology of this planning process is through an example from actual experience. The authors worked with a landowner who acquired a 3100 acre property in north Mississippi. The property had historically been managed for bobwhite and up until the mid nineties carried good bird densities, supporting

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## Wildlife Trends

as many as 140 coveys (1 bird/1.8 acres) in some years. During the late nineties, the property traded hands and during the transition the management program was in flux. As they say, natural succession happens, and in the absence of a regular disturbance regime, things grew up and quail populations declined to less than 1/3 of their previous levels. About 3 years into their ownership, the new owners decided they needed a plan to follow to ensure that their bobwhite population objectives were achieved. They engaged a professional wildlife biologist to develop this plan and help identify financial assistance programs to carry out the plan. The property was approximately 1/3 CP10 grass CRP, 1/3 second-growth hardwoods, and 1/3 open pine, mixed pine hardwood, and pine plantings. The 1000 acres of grass CRP was predominantly broomsedge, with very little fescue or Bermuda, however, the fields were annually clear-mowed and as such provided little bird habitat. The hardwoods had been high-graded and fire damaged. About 220 acres of mature pine had been thinned and regularly

burned, but in recent years an irregular fire regime had allowed understory hardwoods to creep in. About 245 acres of mature pines had a substantial midstory and understory hardwood problem. About 50 acres of 25-yr old pine corridors badly needed to be thinned. The landowners purchased the property explicitly for quail hunting and did not mind investing additional resources in habitat management, however, they were interested in any cost-share or incentive programs that might be available.

### Analysis

This was a perfect example of land enrolled in a conservation program producing very little wildlife habitat value. The quickest and easiest habitat improvement was to shift the CRP CP10 fields from an annual mowing regime to a strip-disking and prescribed fire regime. The annual mowing eliminated standing residual cover essential during winter and early breeding season. Additionally, annual mowing shifts the plant community to a grass-dominated stand with thick



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thatch. The strip-disking would maintain approximately 1/3 of each field in an annual weed community providing brood habitat and winter food resources. The prescribed fire would manage litter accumulation and maintain the broomsedge at an appropriate density for nesting cover. Both diskings and fire would manage succession. In Mississippi, strip-disking and prescribed fire are cost-shared mid-contract management practices on CRP (\$9/ac and \$10/ac, respectively). After modifying the CRP Conservation Plan of Operation (CPO), the landowners were eligible for approximately \$1000/year for strip-disking and \$3500/yr for prescribed fire. As a result of the long-term mowing, sweet-gum thickets had become a problem in some of these CRP fields. The mowing was in part to control woody invasion, but had the effect of simply top-killing the trees, leaving a living below-ground root-mass that would resprout with a vengeance. Long-term control of the trees required an initial herbicide treatment. With a second modification to the CPO, the owners received \$50/ac for selective herbicide (Imazapyr) control of invasive woody species. The thinned, mature pines were not enrolled in CRP, so they were not eligible for this cost-share. However, in Mississippi prescribed fire and selective herbicide are eligible practices under both the Wildlife Habitat Incentive Program and the Forest Land Enhancement Program. Separate contracts (on different stands) under WHIP and FLEP provided about \$5000 each to apply selective herbicide to control the hardwoods and implement a 2-year prescribed fire rotation. A substantial thin, followed by herbicide and fire was planned for 50 acres of pine corridors. The thinning would open the canopy, allowing sunlight to hit the forest floor. This would stimulate herbaceous ground cover. The one-time herbicide application was planned to control the sweetgum which would also respond to the sunlight availability. The prescribed fire would maintain the desired herbaceous ground cover. The herbicide and fire would be cost-shared under WHIP. The net result of thoughtful implementation of prescribed management practices was a dramatic improvement in wildlife habitat quality across the property. The landowners were able to achieve their wildlife habitat objectives and use federal farm conservation programs to ease the financial burden.

In a recent USDA News release, the Secretary of Agriculture touted the conservation achievements of federal conservation programs. These programs have certainly provided substantive environmental benefits. However, it does not happen by accident. Careful planning, using an objective-driven approach, followed by thoughtful and selective enrollment in these programs can help to accomplish landowner wildlife objectives and provide economic assistance as well. Programmatic enrollment should involve development of a conservation plan of operation that maintains the desired wildlife habitat over the life of the contract. As illustrated in this case study, involvement of a wildlife biologist who is knowledgeable about federal farm programs will increase both wildlife habitat value and economic returns from federal farm program participation. For additional information on the objective-driven planning process and 3 more case studies see "Creating Early Successional Wildlife Habitat Through Federal Farm Programs" (<http://www.whmi.nrcs.usda.gov/technical/fieldborder.html>).

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***Leslie Burger** has B.S. and M.S. degrees in Biology from Murray State University and University of Missouri, respectively. She has conducted field research from the Galapagos Islands to Hudson Bay, and several places in between. She has held professional positions with the Missouri Department of Conservation as an assistant research biologist and Vertebrate Ecologist. She currently works full time home schooling the Burger's 3 sons.*



## Conservation Reserve Program

### Overview

USDA Farm Service Agency's (FSA) Conservation Reserve Program (CRP) is a voluntary program available to agricultural producers to help them safeguard environmentally sensitive land. Producers enrolled in CRP plant long-term, resource-conserving covers to improve the quality of water, control soil erosion, and enhance wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. Contract duration is between 10 and 15 years.

The Food Security Act of 1985, as amended, authorized CRP. The program is also governed by regulations published in 7 CFR, part 1410. The program is implemented by FSA on behalf of USDA's Commodity Credit Corporation.

### Benefits

CRP protects millions of acres of American topsoil from erosion and is designed to safeguard the Nation's natural resources. By reducing water runoff and sedimentation, CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams. Acreage enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country.

### CRP Administration

FSA administers CRP, while technical support functions are provided by:

- USDA's Natural Resources Conservation Service (NRCS);
- USDA's Cooperative State Research, Education, and Extension Service;
- State forestry agencies;
- Local soil and water conservation districts; and
- Private sector providers of technical assistance.

### CRP General Sign-up

Producers can offer land for CRP general sign-up enrollment only during designated sign-up periods. For information on upcoming sign-ups, contact your local FSA office. To find your local office, visit FSA's Web site at: [http://oip.usda.gov/scripts/ndisapi.dll/oip\\_agency/index?state=us&agency=fsa](http://oip.usda.gov/scripts/ndisapi.dll/oip_agency/index?state=us&agency=fsa)

### CRP Continuous Sign-up

Environmentally desirable land devoted to certain conservation practices may be enrolled at any time under CRP continuous sign-up. Certain eligibility requirements still apply, but offers are not subject to competitive bidding. Further information on CRP continuous sign-up is available in the FSA fact sheet "Conservation Reserve Program Continuous Sign-up."

### Eligible Producers

To be eligible for CRP enrollment, a producer must have owned or operated the land for at least 12 months prior to close of the CRP sign-up period, unless:

- The new owner acquired the land due to the previous owner's death;
- The ownership change occurred due to foreclosure where the owner exercised a timely right or redemption in accordance with state law; or
- The circumstances of the acquisition present adequate assurance to FSA that the new owner did not acquire the land for the purpose of placing it in CRP.

### Eligible Land

To be eligible for placement in CRP, land must be either:

- Cropland (including field margins) that is planted or considered planted to an agricultural commodity 4 of the previous 6 crop years from 1996 to 2001, and which is physically and legally capable of being planted in a normal manner to an agricultural commodity; or
- Certain marginal pastureland that is enrolled in the Water Bank Program or suitable for use as a riparian buffer or for similar water quality purposes.



## Fact Sheet

### Conservation Reserve Program

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#### **Additional Cropland Requirements**

In addition to the eligible land requirements, cropland must meet one of the following criteria:

- Have a weighted average erosion index of 8 or higher;
- Be expiring CRP acreage; or
- Be located in a national or state CRP conservation priority area.

#### **CRP Payments**

FSA provides CRP participants with annual rental payments, including certain incentive payments, and cost-share assistance:

##### ■ **Rental Payments**

In return for establishing long-term, resource-conserving covers, FSA provides annual rental payments to participants. FSA bases rental rates on the relative productivity of the soils within each county and the average dryland cash rent or cash-rent equivalent. The maximum CRP rental rate for each offer is calculated in advance of enrollment. Producers may offer land at that rate or offer a lower rental rate to increase the likelihood that their offer will be accepted.

##### ■ **Maintenance Incentive Payments**

CRP annual rental payments may include an additional amount up to \$5 per acre per year as an incentive to perform certain maintenance obligations.

##### ■ **Cost-share Assistance**

FSA provides cost-share assistance to participants who establish approved cover on eligible cropland. The cost-share assistance can be an amount not more than 50 percent of the participants' costs in establishing approved practices.

##### ■ **Other Incentives**

FSA may offer additional financial incentives of up to 20 percent of the annual payment for certain continuous sign-up practices.

#### **Ranking CRP Offers**

Offers for CRP contracts are ranked according to the Environmental Benefits Index (EBI). FSA collects data for each of the EBI factors based on the relative environmental benefits for the land offered. Each eligible offer is ranked in comparison to all other offers and selections made from that ranking. FSA uses the following EBI factors to assess the environmental benefits for the land offered:

- Wildlife habitat benefits resulting from covers on contract acreage;
- Water quality benefits from reduced erosion, runoff, and leaching;
- On-farm benefits from reduced erosion;
- Benefits that will likely endure beyond the contract period;

- Air quality benefits from reduced wind erosion; and
- Cost.

#### **For More Information**

For more information on CRP, contact your local FSA office or visit FSA's Web site at: <http://www.fsa.usda.gov/dafp/cepd/crp.htm>

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## Fact Sheet

March 2005

## Conservation Security Program

### Overview

The Conservation Security Program (CSP) is a voluntary conservation program that supports ongoing stewardship of private agricultural lands by providing payments for maintaining and enhancing natural resources. CSP identifies and rewards those farmers and ranchers who are meeting the highest standards of conservation and environmental management on their operations.

CSP provides financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on Tribal and private working lands. Working lands include cropland, grassland, prairie land, improved pasture, and range land, as well as forested land that is an incidental part of an agriculture operation.

CSP is available in all 50 States, the Caribbean area and the Pacific Basin area. The program provides equitable access to benefits to all producers, regardless of size of operation, crops produced, or geographic location.

The Farm Security and Rural Investment Act of 2002 (2002 Farm Bill) (Pub. L. 107-171) amended the Food Security Act of 1985 to authorize the program. CSP is administered by USDA's Natural Resources Conservation Service (NRCS).

### Benefits

CSP will help producers maintain conservation stewardship and implement additional conservation practices that provide added environmental enhancement, while creating powerful incentives for other producers to

meet those same standards of conservation performance.

The conservation benefits gained will help farms and ranches be more environmentally sustainable and will increase the natural resources benefits provided to all Americans.

### How CSP Works

1. The CSP sign-up will be offered in selected watersheds across the Nation. Selected watersheds are listed on the Internet from:  
<http://www.nrcs.usda.gov/programs/csp/> and in NRCS offices nationwide.
2. Producers complete a self-assessment, including description of conservation activities on their operations, to help determine eligibility for CSP at this time. The self-assessment is available from:  
<http://www.nrcs.usda.gov/programs/csp/> and in NRCS state offices on compact disk or as a printed workbook.
3. Eligible producers in the selected watersheds complete the self-assessment and schedule an interview to submit an application at their local NRCS office.
4. Based on the application, description of current conservation activities, and the interview, NRCS determines CSP eligibility and in which program tier and enrollment category the applicant may participate.

### Eligibility

The producer and the producer's operation first must meet the basic eligibility criteria:

- The land must be privately owned or Tribal land and the majority of the land

must be located within one of the selected watersheds.

- The applicant must be in compliance with highly erodible and wetland provisions of the Food Security Act of 1985, have an active interest in the agricultural operation, and have control of the land for the life of the contract.
- The applicant must share in the risk of producing any crop or livestock and be entitled to a share in the crop or livestock marketed from the operation.

All applicants must meet the following minimum tier eligibility and contract requirements, plus any additional requirements in the sign-up announcement:

- For Tier I, the producer must have addressed soil quality and water quality to the described minimum level of treatment for eligible land uses on part of the agricultural operation prior to acceptance.
- For Tier II, the producer must have addressed soil quality and water quality to the described minimum level of treatment on all eligible land uses on the entire agricultural operation prior to acceptance and agree to address one additional resource by the end of the contract period.
- For Tier III, the producer must have addressed all applicable resource concerns to a resource management system level that meets the NRCS Field Office Technical Guide standards on all eligible land uses on the entire agricultural operation before acceptance into the program and have riparian zones adequately treated.

Soil quality practices include crop rotations, cover crops, tillage practices, prescribed grazing, and providing adequate wind barriers.

Water quality practices include conservation tillage, filter strips, terraces, grassed waterways, managed access to water courses,

nutrient and pesticide management, prescribed grazing, and irrigation water management.

### ***CSP Contract Payment***

Applicants may submit only one application for each sign-up. Producers who are participants in an existing conservation stewardship contract are not eligible to submit another application.

CSP contract payments include one or more of the following:

- An annual stewardship component for the existing base level conservation treatment.
- An annual existing practice component for the maintenance of existing conservation practices.
- An enhancement component for exceptional conservation effort and additional conservation practices or activities that provide increased resource benefits beyond the prescribed level.
- A one-time new practice component for additional needed practices.

Enhancements will be made for exceptional conservation effort and additional conservation practices or activities that provide increased resource benefits beyond the prescribed level. There are five types of enhancement activities:

1. The improvement of a significant resource concern to a condition that exceeds the requirements for the participant's tier of participation and contract requirements.
2. An improvement in a priority local resource condition, as determined by NRCS, such as water quality and wildlife.
3. Participation in an on-farm conservation research, demonstration, or pilot project.
4. Cooperation with other producers to implement watershed or regional resource conservation plans that involve at least 75 percent of the producers in the targeted area.
5. Implementation of assessment and evaluation activities relating to practices

included in the conservation security plan, such as water quality sampling at field edges, drilling monitoring wells and collecting data, and gathering plant samples for specific analysis.

Total payments are determined by the tier of participation, conservation treatments completed, and the acres enrolled:

- For Tier I, contracts are for 5 years; maximum payment is \$20,000 annually.
- For Tier II, contracts are for 5 to 10 years; maximum payment is \$35,000 annually.
- For Tier III, contracts are for 5 to 10 years; maximum payment is \$45,000 annually.

### ***For More Information***

If you need more information about CSP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the Internet at:

<http://www.nrcs.usda.gov/programs/farmbill/2002/>



Visit USDA on the Web at:  
<http://www.usda.gov/farmbill>

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## Fact Sheet

October 2004

## ***Environmental Quality Incentives Program***

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### ***Overview***

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, the Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements.

EQIP is reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). Funding for EQIP comes from the Commodity Credit Corporation.

### ***Benefits***

Since EQIP began in 1997, USDA has entered into 117,625 contracts, enrolled more than 51.5 million acres into the program, and obligated nearly \$1.08 billion to help producers advance stewardship on working agricultural land. These efforts have concentrated on improving water quality, conserving both ground and surface water, reducing soil erosion from cropland and forestland, and improving rangeland. EQIP also was used to improve riparian and aquatic areas, improve air quality, and address wildlife issues. The increased funding for EQIP in the 2002 Farm Bill greatly expands program availability for optimizing environmental benefits.

### ***How EQIP Works***

The objective of EQIP, optimize environmental benefits, is achieved through a process that begins with the definition of National priorities. The National priorities are:

- Reduction of non-point source pollution, such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds, consistent with Total Maximum Daily Loads (TMDLs) where available, as well as reduction of groundwater contamination and conservation of ground and surface water resources;
- Reduction of emissions, such as particulate matter, nitrogen oxides (NOx), volatile organic compounds, and ozone precursors and depleters that contribute to air quality impairment violations of National Ambient Air Quality Standards;
- Reduction in soil erosion and sedimentation from unacceptable levels on agricultural land; and
- Promotion of at-risk species habitat conservation.

These priorities are used by the Chief of NRCS to allocate available EQIP funds to State Conservationists. The State Conservationist, with advice from the State Technical Committee, then identifies the priority natural resource concerns in the State that will be used to help guide which applicants are awarded EQIP assistance. After identifying the priority natural resource concerns, the State Conservationist, with advice from the State Technical Committee, decides how funds will be allocated, what practices will be offered, what the cost-share rates will be, the ranking process used to prioritize contracts, and which of these

authorities will be delegated to local level. The local designated conservationist, with the advice of local work groups, adapts the State program to the local conditions. As a result, EQIP can be different between states and even between counties.

The selection of eligible conservation practices and the development of a ranking process to evaluate applications are the final steps in the optimization process. Applications will be ranked based on a number of factors, including the environmental benefits and cost effectiveness of the proposal.

More information regarding State and local EQIP implementation can be found at [http://www.nrcs.usda.gov/programs/eqip/EQIP\\_signup/2004\\_EQIP/2004\\_EQIP.html](http://www.nrcs.usda.gov/programs/eqip/EQIP_signup/2004_EQIP/2004_EQIP.html)

### ***New Provisions***

The 2002 Farm Bill added EQIP funding for Ground and Surface Water Conservation (GSWC) which provides cost-share and incentive payments to producers where the assistance will result in a net savings in ground or surface water resources in the agricultural operation of the producer. In Fiscal Year (FY) 2002, eight states, considered high plains aquifer states, received funding (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming). In FY 2003, in addition to the high plains aquifer states, eight western drought states (Arizona, California, Idaho, Montana, North Dakota, Oregon, Utah, and Washington) also received GSWC funding. GSWC provided \$45 million for FY 2003. An additional \$50 million was appropriated for fiscal years 2002-2007 to support use and installation of ground and surface water conservation practices in the Klamath River Basin, located on the Oregon and California state boundary.

### ***Eligibility***

Persons engaged in livestock or agricultural production are eligible for the program. Eligible land includes cropland, rangeland, pasture, private non-industrial forestland, and

other farm or ranch lands. Persons interested in entering into a cost-share agreement with the U.S. Department of Agriculture (USDA) for EQIP assistance may file an application at any time. To be eligible to participate, applicants must:

- Be an agricultural producer;
- Be in compliance with the highly erodible land and wetland conservation provisions of the 1985 Farm Bill;
- Provide the Social Security number of all individuals who will benefit from the assistance; and
- Develop an EQIP plan of operations, including:
  - The participant's specific conservation and environmental objectives to be achieved;
  - One or more conservation practices in the conservation management system to be implemented to achieve the conservation and environmental objectives; and
  - The schedule for implementing the conservation practices.

If an EQIP plan of operations includes an animal waste storage or treatment facility, the participant must provide for the development and implementation of a comprehensive nutrient management plan.

NRCS works with the participant to develop the EQIP plan of operations. This plan becomes the basis of the cost-share agreement between NRCS and the participant. NRCS provides cost-share payments to landowners under these agreements that can be up to 10 years in duration.

The 2002 Farm Bill limits the total amount of cost-share and incentive payments paid to an individual or entity to an aggregate of \$450,000, directly or indirectly, for all contracts entered into during fiscal years 2002 through 2007.

The Adjusted Gross Income provision of the 2002 Farm Bill impacts eligibility for EQIP and several other 2002 Farm Bill programs. Individuals or entities that have an average adjusted gross income exceeding \$2.5 million for the three tax years immediately preceding the year the contract is approved are not eligible to receive program benefits or payments. However, an exemption is provided in cases where 75 percent of the adjusted gross income is derived from farming, ranching, or forestry operations.

### ***Practice Payments***

Cost-sharing may pay up to 75 percent of the costs of certain conservation practices, such as grassed waterways, filter strips, manure management facilities, capping abandoned wells, and other practices important to improving and maintaining the health of natural resources in the area. The EQIP cost-share rates for limited resource producers and beginning farmers and ranchers may be up to 90 percent. USDA has established a self-determination tool for applicants to determine eligibility as a limited resource producer. The tool can be found at: <http://www.nrcs.usda.gov/programs/smlfarmer/tool.asp>.

Incentive payments may be made to encourage a producer to perform land management practices, such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management. These payments may be provided for up to three years to encourage producers to carry out management practices that they otherwise might not implement.

### ***How to Apply for EQIP***

Applications may be obtained and filed at any time with your local USDA Service Center or conservation district office. Applications also may be obtained through USDA's e-gov Web site at: <http://www.sc.egov.usda.gov>. Enter "Natural Resources Conservation Service" in the Agency field, "Environmental Quality Incentives Program" in the Program Name field, and "CCC-1200" in the Form Number field. Applications also may be accepted by cooperating conservation partners approved or designated by NRCS.

Applications are accepted through a continuous sign-up process. The local decision makers periodically will announce a ranking date when applications received will be ranked.

### ***For More Information***

If you need more information about EQIP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at: <http://www.nrcs.usda.gov/programs/farmbill/2002/>



Visit USDA on the Web at:  
<http://www.usda.gov/farmbill>

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**At a Glance:**  
**Environmental Quality  
Incentives Program**

May 2008

**Overview**

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial and technical assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, the Natural Resources Conservation Service (NRCS) provides financial incentives to producers to promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental regulations.

**Legislative Changes**

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) clarifies EQIP purposes to include forest management and energy conservation, as well as practices related to organic production and fuels management.

The 2008 Farm Bill authorizes increased payments for socially disadvantaged farmers or ranchers in addition to beginning and limited resource producers – up to 90 percent. It further allows these individuals to receive in advance up to 30 percent of the amount needed for purchasing materials or contracting.

Priority will be given to water conservation or irrigation efficiency applications that will reduce water use or where the producer agrees not to use any associated water savings to bring new land under irrigation production.

Assistance to organic production operations will be based on producers agreeing to develop

and carry out organic system plans. Payments for conservation practices related to organic production may not exceed \$20,000 per year or \$80,000 during any 6-year period.

The overall payment limitation is reduced to \$300,000 per person or legal entity over a 6-year period. The Secretary of Agriculture may raise the limitation to \$450,000 for projects of special environmental significance, including those involving methane digesters.

Applications that improve conservation practices or systems already in place at the time of offer acceptance will be given priority. Offers shall be grouped by similar crop or livestock operations for evaluation purposes.

Funding for each fiscal year is authorized as follows: \$1.2 billion for 2008; \$1.337 billion for 2009; \$1.45 billion for 2010; \$1.588 billion for 2011; and \$1.75 billion for 2012.

**More Information**

For more information and updates about EQIP and other Farm Bill topics, please refer to the U.S. Department of Agriculture Web site <http://www.usda.gov/farmbill> or the Natural Resources Conservation Service Web site <http://www.nrcs.usda.gov/programs/eqip>.







# Farm Bill 2002

## Fact Sheet

September 2004

## Grassland Reserve Program

### Overview

The Grassland Reserve Program (GRP) is a voluntary program that helps landowners and operators restore and protect grassland, including rangeland, pastureland, shrubland, and certain other lands, while maintaining the areas as grazing lands. The program emphasizes support for working grazing operations; enhancement of plant and animal biodiversity; and protection of grassland and land containing shrubs and forbs under threat of conversion to cropping, urban development, and other activities that threaten grassland resources.

GRP is authorized by the Food Security Act of 1985, as amended by the Farm Security and Rural Investment Act of 2002 (2002 Farm Bill). The USDA Natural Resources Conservation Service (NRCS) and USDA Farm Service Agency (FSA) administer the program, in cooperation with the USDA Forest Service. Funding for the GRP comes from the Commodity Credit Corporation (CCC).

### Benefits

Restoring and protecting grasslands contributes positively to the economy of many regions, provides biodiversity of plant and animal populations, and improves environmental quality.

### How GRP Works

Applications may be filed for an easement or rental agreement with NRCS or FSA at any time. Participants voluntarily limit future use of the land while retaining the right to conduct common grazing practices; produce hay, mow, or harvest for seed production (subject to certain restrictions during the nesting season of bird species that are in significant decline or

those that are protected under Federal or State law); conduct fire rehabilitation; and construct firebreaks and fences.

GRP contracts and easements prohibit the production of crops (other than hay), fruit trees, and vineyards that require breaking the soil surface and any other activity that would disturb the surface of the land, except for appropriate land management activities included in a conservation plan.

Each state will establish ranking criteria that will prioritize enrollment of working grasslands. The ranking criteria will consider threats of conversion, including cropping, invasive species, urban development, and other activities that threaten plant and animal diversity on grazing lands.

The program offers several enrollment options:

*Permanent Easement.* This is a conservation easement in perpetuity. Easement payments for this option equal the fair market value, less the grassland value of the land encumbered by the easement. These values will be determined using an appraisal.

*Thirty-year Easement.* USDA will provide an easement payment equal to 30 percent of the fair market value of the land, less the grassland value of the land of the land encumbered by the easement.

For both easement options, USDA will provide all administrative costs associated with recording the easement, including appraisal fees, survey costs, title insurance, and recording fees. Easement payments may

be provided, at the participant's request, in lump sum or annual payments (equal or unequal amounts) for up to 10 years.

*Rental Agreement.* Participants may choose a 10-year, 15-year, 20-year, or 30-year contract. USDA will provide annual payments in an amount that is not more than 75 percent of the grazing value of the land covered by the agreement for the life of the agreement. Payments will be disbursed on the agreement anniversary date each year.

*Restoration agreement.* An approved grassland resource management plan identifying required restoration activities will be incorporated within the rental agreement or easement. CCC may provide up to 90 percent of the restoration costs on lands that have never been cultivated, and up to 75 percent of the cost on restored grasslands and shrub lands that were previously cropped. Participants will be paid upon certification of the completion of the approved practice(s) by NRCS or an approved third party. Participants may contribute to the application of a cost-share practice through in-kind contributions. The combined total cost-share provided by Federal or State Governments may not exceed 100 percent of the total actual cost of restoration.

### ***Eligibility***

Landowners who can provide clear title on privately owned lands are eligible to participate for either easement option. Landowners and others who have general control of the acreage may submit an application for a rental agreement.

There is no national maximum limitation on the amount of land that may be offered for the program. However, there is a minimum requirement established in law. Offers for enrollment must contain at least 40 contiguous acres, unless special circumstances exist to accept a lesser amount. These special circumstances are determined by the NRCS State Conservationist.

The Adjusted Gross Income provision of the 2002 Farm Bill impacts eligibility for GRP and several other 2002 Farm Bill programs. Individuals or entities that have an average adjusted gross income exceeding \$2.5 million for the three tax years immediately preceding the year the contract is approved are not eligible to receive program benefits or payments. However, an exemption is provided in cases where 75 percent of the adjusted gross income is derived from farming, ranching, or forestry operations.

Eligible land includes privately owned and Tribal lands, such as grasslands; land that contains forbs (including improved rangeland and pastureland or shrubland); or land that is located in an area that historically has been dominated by grassland, forbs, or shrubland that has the potential to serve as wildlife habitat of significant ecological value. Incidental lands may be included to allow for the efficient administration of an agreement or easement.

### ***For More Information***

If you need more information about GRP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at: <http://www.nrcs.usda.gov/programs/farmbill/2002/> and <http://www.fsa.usda.gov/dafp/GRP/default1.htm>



Visit USDA on the Web at:  
<http://www.usda.gov/farmbill>

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## *At a Glance:* **Grassland Reserve Program**

May 2008

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### **Overview**

The Grassland Reserve Program (GRP) is a voluntary program for landowners and operators to protect, restore, and enhance grassland, including rangeland, pastureland, shrubland, and certain other lands. The program emphasizes support for working grazing operations; enhancement of plant and animal biodiversity; and protection of grassland and land containing shrubs and forbs under threat of conversion.

In the last 5 years, GRP has closed on over 250 easements covering more than 115,000 acres in 38 states.

The USDA Natural Resources Conservation Service (NRCS) and USDA Farm Service Agency (FSA) jointly administer this program. Funding for GRP comes from the Commodity Credit Corporation (CCC).

### **Legislative Changes**

- The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) increases the acreage that may be enrolled in the program by 1.2 million acres during the years 2009 through 2012.
- The 2008 Farm Bill provides priority for enrollment of expiring acreage from the Conservation Reserve Program (CRP), limited to 10 percent of the total acres enrolled in any year. Eligible lands can be enrolled into either a permanent easement (or maximum allowed under State law); or a 10-, 15-, or 20-year rental contract. Restoration agreements, based on a 50 percent cost-share, may be placed on land enrolled under a rental contract or easement.

- The definition of eligible land has also been expanded to include land that contains historical or archeological resources and land that addresses State, regional, or national conservation priorities.
- The Bill requires a grazing management plan for participants.
- Valuation of an easement is required to be at the lowest of either an appraisal or market survey; a rate set by the Secretary of Agriculture; or the landowner's offer.

Easements may now be acquired by eligible entities based on a 50 percent cost-share with the Federal government. Eligible entities are defined as units of State, local or Tribal government or nongovernmental organizations that have a charter describing a commitment to conserving ranchland, agricultural land, or grassland for grazing and conservation purposes.

Enforcement of the easement is the responsibility of the eligible entity; failure to do so will result in Federal enforcement, as mandated by the 2008 Farm Bill.

The 2008 Farm Bill establishes an annual payment limitation of \$50,000 for both rental and restoration agreements.

### **More Information**

For more information and updates about the GRP and other Farm Bill topics, please refer to the U.S. Department of Agriculture Web site <http://www.usda.gov/farmbill> or the Natural Resources Conservation Service Web site <http://www.nrcs.usda.gov/programs/grp>.



## Fact Sheet

September 2004

## ***Wildlife Habitat Incentives Program***

### ***Overview***

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program that encourages creation of high quality wildlife habitats that support wildlife populations of National, State, Tribal, and local significance. Through WHIP, the Natural Resources Conservation Service (NRCS) provides technical and financial assistance to landowners and others to develop upland, wetland, riparian, and aquatic habitat areas on their property.

WHIP is reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). Through WHIP, NRCS works with private landowners and operators; conservation districts; and Federal, State, and Tribal agencies to develop wildlife habitat on their property. Funding for WHIP comes from the Commodity Credit Corporation.

### ***Benefits***

Since WHIP began in 1998, nearly 14,700 participants have enrolled more than 2.3 million acres into the program. Most efforts have concentrated on improving upland wildlife habitat, such as native prairie, but there is an increasing emphasis on improving riparian and aquatic areas. The 2002 Farm Bill greatly expands the available tools for improving wildlife habitat conditions across the Nation.

Species that have benefited from WHIP activities include the grasshopper sparrow, bobwhite quail, swift fox, short-eared owl, Karner-blue butterfly, gopher tortoise, Louisiana black bear, Eastern collared lizard,

Bachman's sparrow, ovenbird, acorn woodpecker, greater sage grouse, and salmon.

### ***How WHIP Works***

The State Technical Committee advises the State Conservationist in the development of a State WHIP plan. The State WHIP plan serves as a guide for the development of the State WHIP ranking criteria.

Persons interested in entering into a cost-share agreement with the U.S. Department of Agriculture (USDA) to develop wildlife habitat may file an application at any time. Participants voluntarily limit future use of the land for a period of time, but retain private ownership.

NRCS works with the participant to develop a wildlife habitat development plan. This plan becomes the basis of the cost-share agreement between NRCS and the participant. NRCS provides cost-share payments to landowners under these agreements that are usually 5 to 10 years in duration, depending upon the practices to be installed.

There are shorter-term agreements to install practices that are needed to meet wildlife emergencies, as approved by the NRCS State Conservationist. NRCS also provides greater cost-share assistance to landowners who enter into agreements of 15 years or more for practices on essential plant and animal habitat. NRCS can use up to 15 percent of its available WHIP funds for this purpose.

NRCS does not place limits on the number of acres that can be enrolled in the program or the amount of payment made; however, some

States may choose to establish such requirements. NRCS welcomes projects that provide valuable wildlife habitat and does not want to discourage any landowner who desires to implement practices that will improve habitat conditions for declining species.

NRCS continues to provide assistance to landowners after completion of habitat development activities. This assistance may be in the form of monitoring habitat practices, reviewing management guidelines, or providing basic biological and engineering advice on how to achieve optimum results for targeted species.

Applications are accepted through a continuous sign-up process. Applications may be obtained and filed at any time with your local USDA Service Center or conservation district office. Applications also may be obtained through USDA's e-gov Internet site at: [www.sc.egov.usda.gov](http://www.sc.egov.usda.gov). Click on Register to open a USDA account and then have access to a WHIP application (CCC-1200) or other USDA programs. Applications also may be accepted by cooperating conservation partners approved or designated by NRCS.

### ***Eligibility***

Eligible lands under the program are:

- Privately owned land;
- Federal land when the primary benefit is on private or Tribal land;
- State and local government land on a limited basis; and
- Tribal land.

If land is determined eligible, NRCS places emphasis on enrolling:

- Habitat areas for wildlife species experiencing declining or significantly reduced populations;
- Practices beneficial to fish and wildlife that may not otherwise be funded; and

- Wildlife and fishery habitats identified by local and State partners and Indian Tribes in each State.

The Adjusted Gross Income provision of the 2002 Farm Bill impacts eligibility for WHIP and several other 2002 Farm Bill programs. Individuals or entities that have an average adjusted gross income exceeding \$2.5 million for the three tax years immediately preceding the year the contract is approved are not eligible to receive program benefits or payments. However, an exemption is provided in cases where 75 percent of the adjusted gross income is derived from farming, ranching, or forestry operations.

### ***For More Information***

If you need more information about WHIP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at: <http://www.nrcs.usda.gov/programs/farmbill/2002/>



Visit USDA on the Web at:  
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**At a Glance:**  
**Wildlife Habitat  
Incentives Program**

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May 2008

**Overview**

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program for private landowners to develop and improve high quality habitat that supports wildlife populations of National, State, Tribal, and local significance. Through WHIP, the USDA's Natural Resources Conservation Service (NRCS) provides technical and financial assistance. WHIP agreements generally last from 5 to 10 years.

**Legislative Changes**

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) extends the authority to the Secretary of Agriculture for carrying out the program during fiscal years 2008 through 2012.

Non-agricultural lands, as well as State, county, or local government-owned lands are now ineligible for WHIP.

Land eligible for WHIP includes:

- Private agricultural land,
- Non-industrial private forest land, and
- Tribal land.

The 2008 Farm Bill authorizes WHIP cost-share payments to be made to landowners to develop other types of wildlife habitat including habitat developed on pivot corners and irregular areas.

The total of WHIP funds available for use in long-term agreements to protect and restore

plant and animal habitat is increased from 15 percent to 25 percent. Such agreements have a term of at least 15 years.

Priority will be given to projects that address issues raised by State, regional, and national conservation initiatives.

WHIP payments made, either directly or indirectly, to a person or legal entity, may not exceed \$50,000 per year.

Funding for WHIP is authorized at \$85,000,000 per fiscal year through 2012.

**More Information**

For more information and updates about WHIP and other Farm Bill topics, please refer to the U.S. Department of Agriculture Web site <http://www.usda.gov/farmbill> or the Natural Resources Conservation Service Web site <http://www.nrcs.usda.gov/programs/whip>.



## Fact Sheet

September 2004

## Wetlands Reserve Program

### Overview

The Wetlands Reserve Program (WRP) is a voluntary program that provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to restore, protect, and enhance wetlands in exchange for retiring marginal land from agriculture. WRP is reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). The Natural Resources Conservation Service (NRCS) administers the program. Funding for WRP comes from the Commodity Credit Corporation.

### Benefits

WRP participants benefit by:

- Receiving financial and technical assistance in return for restoring, protecting and enhancing wetland functions and values;
- Seeing a reduction in problems associated with farming potentially difficult areas; and
- Having incentives to develop wildlife recreational opportunities on their land.

Wetlands benefit the Nation by providing fish and wildlife habitat; improving water quality by filtering sediments and chemicals; reducing flooding; recharging groundwater; protecting biological diversity; as well as providing opportunities for educational, scientific, and recreational activities.

### How WRP Works

Landowners and Tribes may file an application for a conservation easement or a cost-share restoration agreement with the U.S.

Department of Agriculture (USDA) to restore and protect wetlands. Participants voluntarily limit future use of the land, but retain private ownership.

The program offers three enrollment options:

*Permanent Easement.* This is a conservation easement in perpetuity. Easement payments for this option equal the lowest of three amounts: the agricultural value of the land, an established payment cap, or an amount offered by the landowner. In addition to paying for the easement, USDA pays 100 percent of the costs of restoring the wetland.

*30-Year Easement.* Easement payments through this option are 75 percent of what would be paid for a permanent easement. USDA also pays up to 75 percent of restoration costs.

For both permanent and 30-year easements, USDA pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

*Restoration Cost-Share Agreement.* This is an agreement (generally for a minimum of 10 years) to re-establish degraded or lost wetland habitat. USDA pays up to 75 percent of the cost of the restoration activity. This enrollment option does not place an easement on the property. Other agencies, conservation districts, and private conservation

organizations may provide additional incentive payments as a way to reduce the landowner's share of the costs. Such special partnership efforts are encouraged.

NRCS and its partners, including conservation districts, continue to provide assistance to landowners after completion of restoration activities. This assistance may be in the form of reviewing restoration measures, clarifying technical and administrative aspects of the easement and project management needs, and providing basic biological and engineering advice on how to achieve optimum results for wetland dependent species.

Applications are accepted through a continuous sign-up process. Applications may be obtained and filed at any time with your local USDA Service Center or conservation district office. Applications also may be obtained through USDA's e-gov Internet site at: [www.sc.egov.usda.gov](http://www.sc.egov.usda.gov). Enter "Natural Resources Conservation Service" in the Agency field, "Wetlands Reserve Program" in the Program Name field, and "AD-1153" in the Form Number field.

### ***Eligibility***

To offer a conservation easement, the landowner must have owned the land for at least 12 months prior to enrolling it in the program, unless the land was inherited, the landowner exercised the landowner's right of redemption after foreclosure, or the landowner can prove the land was not obtained for the purpose of enrolling it in the program. To participate in a restoration cost-share agreement, the landowner must show evidence of ownership.

To be eligible for WRP, land must be restorable and be suitable for wildlife benefits. This includes:

- Wetlands farmed under natural conditions;
- Farmed wetlands;
- Prior converted cropland;

- Farmed wetland pasture;
- Farmland that has become a wetland as a result of flooding;
- Range land, pasture, or production forest land where the hydrology has been significantly degraded and can be restored;
- Riparian areas which link protected wetlands;
- Lands adjacent to protected wetlands that contribute significantly to wetland functions and values; and
- Previously restored wetlands that need long-term protection.

*Ineligible Land.* Ineligible land includes wetlands converted after December 23, 1985; lands with timber stands established under a Conservation Reserve Program contract; Federal lands; and lands where conditions make restoration impossible.

The Adjusted Gross Income provision of the 2002 Farm Bill impacts eligibility for WRP and several other 2002 Farm Bill programs. Individuals or entities that have an average adjusted gross income exceeding \$2.5 million for the three tax years immediately preceding the year the contract is approved are not eligible to receive program benefits or payments. However, an exemption is provided in cases where 75 percent of the adjusted gross income is derived from farming, ranching, or forestry operations.

### ***Uses of WRP Land***

On acreage subject to a WRP easement, participants control access to the land and may lease the land for hunting, fishing, and other undeveloped recreational activities. At any time, a participant may request that additional activities be evaluated to determine if they are compatible uses for the site. This request may include such items as permission to cut hay, graze livestock, or harvest wood products. Compatible uses are allowed if they are fully consistent with the protection and enhancement of the wetland.



***For More Information***

If you need more information about WRP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at:

<http://www.nrcs.usda.gov/programs/farmbill/2002/>



Visit USDA on the Web at:  
<http://www.usda.gov/farmbill>

**Note:** This is not intended to be a definitive interpretation of farm legislation. Rather, it is preliminary and may change as USDA develops implementing policies and procedures. Please check back for updates.

## At a Glance: Wetlands Reserve Program

May 2008

### Overview

The Wetlands Reserve Program (WRP) is a voluntary program that provides technical and financial assistance to private landowners and Tribes to restore, protect, and enhance wetlands in exchange for retiring eligible land from agriculture. Over 1.9 million acres are currently enrolled in WRP.

Wetlands provide habitat for fish and wildlife, including threatened and endangered species; improve water quality by filtering sediments and chemicals; reduce flooding; recharge groundwater; protect biological diversity; and provide opportunities for educational, scientific, and limited recreational activities.

The program offers three enrollment options:

1. *Permanent Easement* is a conservation easement in perpetuity. USDA pays 100 percent of the easement value and up to 100 percent of the restoration costs.
2. *30-Year Easement* is an easement that expires after 30 years. USDA pays up to 75 percent of the easement value and up to 75 percent of the restoration costs.

For both permanent and 30-year easements, USDA pays all costs associated with recording the easement in the local land records office, including recording fees, charges for abstracts, survey and appraisal fees, and title insurance.

3. *Restoration Cost-Share Agreement* is an agreement to restore or enhance the wetland functions and values without placing an easement on the enrolled acres. USDA pays up to 75 percent of the restoration costs.

### Legislative Changes

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) changes the process for determining the easement value, directing the Secretary of Agriculture to pay the lowest of:

- the fair market value of the land according to the Uniform Standards of Professional Appraisal Practices or an area-wide market analysis;
- the geographic area rate cap as determined by the Secretary of Agriculture; or
- the landowner's offer.

Other important legislative changes include:

- The total number of acres that can be enrolled in the program is 3,041,200 – an increase of 766,200 additional acres.
- Payments for easements valued at \$500,000 or more will be made in at least five annual payments.
- For restoration cost-share agreements, annual payments may not exceed \$50,000 per year.
- No easement shall be created on land that has changed ownership during the preceding 7 years.
- Eligible acres are limited to private and Tribal lands.

### More Information

For more information and updates about WRP and other Farm Bill topics, please refer to the U.S. Department of Agriculture Web site <http://www.usda.gov/farmbill> or the Natural Resources Conservation Service Web site <http://www.nrcs.usda.gov/programs/wrp>



## ***Summary of NRCS Conservation Programs***

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July 2002

### ***Landmark Legislation for Conservation***

The Farm Security and Rural Investment Act of 2002 (Farm Bill) is landmark legislation for conservation funding and for focusing on environmental issues. The conservation provisions will assist farmers and ranchers in meeting environmental challenges on their land. This legislation simplifies existing programs and creates new programs to address high priority environmental and production goals. The 2002 Farm Bill enhances the long-term quality of our environment and conservation of our natural resources. The Natural Resources Conservation Service (NRCS) administers the following programs authorized or re-authorized in the 2002 Farm Bill.

### ***Conservation of Private Grazing Land Program***

The Conservation of Private Grazing Land Program (CPGL) is a voluntary program that helps owners and managers of private grazing land address natural resource concerns while enhancing the economic and social stability of grazing land enterprises and the rural communities that depend on them.

### ***Conservation Security Program***

The Conservation Security Program is a voluntary program that provides financial and technical assistance for the conservation, protection, and improvement of soil, water, and related resources on Tribal and private lands. The program provides payments for producers who historically have practiced good stewardship on their agricultural lands and incentives for those who want to do more. The program will be available in fiscal year 2003.

### ***Environmental Quality Incentives Program***

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program that promotes agricultural production and environmental quality as compatible National goals. Through EQIP, farmers and ranchers may receive financial and technical help to install or implement structural and management conservation practices on eligible agricultural land.

### ***Farmland Protection Program***

The Farmland Protection Program is a voluntary program that helps farmers and ranchers keep their land in agriculture. The program provides matching funds to State, Tribal, or local governments and non-governmental organizations with existing farmland protection programs to purchase conservation easements or other interests in land.

### ***National Natural Resources Conservation Foundation***

The National Natural Resources Conservation Foundation (NNRCF) promotes innovative solutions to natural resource problems and conducts research and educational activities to support conservation on private land. The NNRCF is a private, nonprofit 501(c)(3) corporation. The foundation builds partnerships among agencies and agricultural, public, and private constituencies interested in promoting voluntary conservation on private lands.

### ***Resource Conservation and Development Program***

The Resource Conservation and Development Program (RC&D) encourages and improves the capability of civic leaders in designated RC&D areas to plan and carry out projects for resource conservation and community development. Program objectives focus on “quality of life” improvements achieved through natural resources conservation and community development. Such activities lead to sustainable communities, prudent land use, and the sound management and conservation of natural resources.

### ***Wetlands Reserve Program***

The Wetlands Reserve Program is a voluntary program that provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private land in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal land from agriculture.

### ***Wildlife Habitat Incentives Program***

The Wildlife Habitat Incentives Program (WHIP) is a voluntary program that encourages creation of high quality wildlife habitats that support wildlife populations of National, State, Tribal, and local significance. Through WHIP, NRCS provides technical and financial assistance to landowners and others to develop upland, wetland, riparian, and aquatic habitat areas on their property.

### ***For More Information***

If you need more information about these and other conservation programs, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at:

<http://www.nrcs.usda.gov/programs/farmland/2002/>



Visit USDA on the Web at:  
<http://www.usda.gov/farmland>

# Farmers Market

## Starting a Farmers' Market<sup>1</sup>

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M.E. Swisher, James Sterns, and Jennifer Gove<sup>2</sup>

### Overview

There are many details that separate great farmers' markets from struggling or mediocre markets. Below are eight of the most important steps to consider as you start a farmers' market in your community. Also included are Useful Facts about Farmers' Markets, legal information, an example of bylaws and rules for a farmers' market and links to farmers' markets online.

#### 1. Research and solicit available community resources.

Community support for a farmers' market is invaluable. Getting “buy-in” from residents as well as government and businesses will ensure that the market is seen as contributing to the life of the community. In addition to the intangible factors, a good relationship with the market's neighbors will help in tangible ways. City and county government agencies and local business may be willing and able to help with finding a location, sponsoring and/or doing advertising for the market or other resources.

#### 2. Select a location

Selecting a location is a tricky issue. Essential components are proximity to your customers or where your customers frequently go, available parking, cover or shade in case of extreme weather, and seating for lingering and socializing, listening to music, or other recreational or educational activities associated with the market. The location you select may also determine your insurance needs.

#### 3. Solicit vendors

Soliciting vendors may be the toughest job of all. A successful market needs a good mix of products and services to attract a regular clientele. Many county extension offices keep a list of small farmers. Your chamber of commerce or craftpersons guild may be another resource for potential vendors. Once you have identified potential vendors, you may have to sell the idea of a market to them. Farmers, craftspeople and other small business owners must be convinced that spending a few hours a week at the market is worth their time.

#### 4. Market the Market

It may seem obvious, but farmers' markets need to be advertised to the public, especially when they

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2. M.E. Swisher, Ph.D., associate professor, Department of Family, Youth and Community Sciences, James Sterns, Ph.D., assistant professor, Department of Food and Resource Economics, and Jennifer Gove, Graduate Assistant, Department of Family, Youth and Community Sciences, University of Florida, Gainesville FL 32611.

first open. Public radio and local newspaper ads are less expensive than commercial radio or TV ads. Of course free publicity is the best of all. Investigate putting an announcement in a neighborhood or school newsletter. The Food Gardening and Weekend sections of newspapers may all be appropriate places to solicit articles about a new farmers' market. The Farmers' Market can serve as a source of entertainment. Live acoustic music adds atmosphere and entertainment to a market. Inviting service groups, churches and educational groups (think about Master Gardeners, Native Plant Society, FFA) and giving them free space at the market will contribute to the variety and sense of liveliness of the market. Clowns, pony rides and other children's entertainment can attract more customers.

Whats next? Perhaps now you have a farmers' market that is up and running. What are the next steps you should be thinking of?

#### **5. Develop by-laws and market rules**

There are some general points to be considered when developing market rules and by-laws. For templates of By-laws and Market Rules, see the examples in the Bylaws and Rules section.

#### **6. Apply for non-profit status**

Contact the Florida Department of Revenue at 1-800-352-3671 (in Florida only) or 1-850-488-6800.

#### **7. Identify a market manager**

The type of market manager you hire will depend on the kind of farmers' market you and the Board of Directors want to create. At first you or another vendor may volunteer as the manager, but successful markets sometimes grow big enough to require full-time management.

#### **8. Get the right market insurance**

The market's insurance needs will depend on a variety of factors. You should consult an insurance specialist to determine what type of insurance your market will need.

The USDA's Farm Service Agency (FSA) provides credit assistance, food aid and conservation

incentives to help stabilize farm incomes and provide disaster assistance. The USDA has local service centers around the country that help farmers navigate their way through a myriad of federal assistance programs. To find a service center, go to <http://www.fsa.usda.gov/edso>

The USDA's Risk Management Agency (RMA) provides crop insurance through a variety of approved insurance providers. The agency's website provides an overview of various insurance policies. To speak with an authorized agent, go to the RMA homepage and on the left-hand navigation bar, click on Agent Locator. The regional RMA office in Valdosta, Georgia, covers Florida. From the RMA homepage, click on field offices on the left hand navigation bar.

Florida Farm Bureau Insurance may be an option. Farm Bureau members are eligible for insurance through Florida Farm Bureau Insurance.

### **Useful Facts about Farmers' Markets**

In 2000, about 2800 farmers' markets were operating in the United States. This represents a 63% increase in the number of farmers' markets from 1994. It is estimated that more than 20,000 farmers participate in farmers' markets. The USDA's Farmers' Market webpage includes more statistics and factoids as well as information and resources on farmers' markets and a national directory of farmers' markets, go to <http://www.ams.usda.gov/farmersmarkets/> also see the Farmers' Markets on the Web section for a list of farmers markets on the web.

### **Buy Smart, Buy Local**

Farmers' markets and other direct marketing venues make locally grown produce available to consumers. Buying local has positive impacts on farmers, consumers and their communities. The *Buy Smart! Buy Local!* brochure explains why a vibrant local agriculture economy is important. This brochure is available at <http://smallfarm.ifas.ufl.edu/Farmers%20Market/consumer.pdf>

## Accepting Food Stamps and Other Forms of Public Assistance

The Food and Nutrition Service (FNS) of the USDA increases food security and reduces hunger by providing children, seniors and low-income people with increased access to food and nutrition education. Farmers and farmers' markets can participate in FNS programs in three ways.

The most widespread of these programs is the Women, Infants and Children (WIC) program, which provides supplemental assistance to eligible families with young children. WIC program information can be found by beginning at the FNS homepage and then clicking on WIC/Farmers' Markets and then on Farmers' Market Nutrition Programs. State agencies authorize farmers and farmers' markets to accept WIC coupons. The Florida state contact is Carl Penn (850) 487-4322. A list of all state contacts can be found at <http://www.fns.usda.gov/wic/contacts/farm.HTM>

The Farmers' Market Nutrition Program also includes the relatively new Senior Nutrition Pilot Program. Like the WIC program, the Seniors program is administered through state agencies. For more information contact Holly Greuling (850) 414-2337.

Finally, a few farmers' markets have participated in a pilot program to accept food stamp benefit with the Electronic Benefits Transfer (EBT) system. Currently, 80% of food stamp benefits are issued via EBT. To get an update on EBT and farmers' markets, begin at the FNS homepage, and click on the EBT heading under Food Stamps and then on EBT & Farmers' Markets.

## Legal Concerns

The most comprehensive and helpful book to date is called *The Legal Guide to Direct Farm Marketing* by Neil Hamilton. It covers all aspects of general legal information for farmers engaged in direct marketing and devotes an entire chapter to legal issues facing farmers' markets.

Copies of this book can be purchased for \$20.00 from Drake University Agricultural Law Center, Des

Moines, Iowa 50311. For more information call (515) 271-2065.

## Health Department Licensure

Many counties and states have health laws pertaining to meat and poultry products as well as processed, value added food items. Check with your local extension office and/or county health department about licensing requirements in your area.

## Bylaws and Rules

### ARTICLE I - Name

The name of this Corporation is the "Downtown Farmers' Market of Big Lake, Inc." and may be referred to in these Bylaws as the "Corporation."

### ARTICLE II - Purpose & Objectives

Section 1. The Downtown Farmers' Market of Big Lake, Inc. has been formed to provide healthy, fresh foods and horticultural products to Alligator County and surrounding areas, and to encourage commerce, entertainment and trade in Downtown Big Lake. (Mission Statement established June 1, 2001)

Section 2. To achieve its mission, the Corporation shall do the following:

a. Establish and operate a farmers' market for the purpose of furnishing a facility for sales of Florida fresh foods and horticultural products.

b. Work with the Alligator County Agricultural Extension Office/University of Florida (Institute of Food and Agricultural Sciences) and similar organizations to promote the production of Florida fresh produce and horticultural products in Vegetable County.

c. Organize and/or participate in educational and other activities that promote the use of Florida fresh produce and horticultural products.

d. Organize and/or participate in those activities that, in conjunction with the operation of a farmers' market, will serve to encourage commerce and trade in Downtown Big Lake.



e. Organize and/or participate in those activities that will serve to further the Corporation's mission.

f. Conduct research necessary to further the development of the farmers' market.

g. Solicit and receive funds, gifts, endowments, donations, devises and bequests.

h. Lease and/or purchase property necessary to further the mission of the Corporation.

Section 3. It is hereby provided that the said purposes are not intended to limit or restrict in any manner the powers or purposes of this corporation to any extent permitted by law, nor shall the expression of one thing be deemed to exclude another although it be of like nature.

Section 4. The Corporation is organized exclusively for public purposes as a not-for-profit corporation. Its activities shall be conducted in such a manner that no part of its net earnings will inure to the benefit of any member, director, officer or individual. In addition, the Corporation shall be authorized to exercise the powers permitted not-for-profit corporations under Chapter 617 of the Florida Statutes as now exists or is subsequently amended or superseded provided, however, the furtherance of the exempt purpose for which it has been organized is as described in Section 501 (c)(3) of the Internal Revenue Code or any amendments or additions thereto.

Section 5. The Corporation shall be nonsectarian and nonpartisan.

### **ARTICLE III - Membership**

Section 1. Any person interested in and who supports the purpose and objectives of the Corporation shall be eligible for membership.

Section 2. The membership of the Corporation shall be representative of a broad cross section of the community which it serves, including but not limited to representatives from business, citrus, government, horticulture, and education.

Section 3. Criteria for membership may be from time-to-time established by the Corporation Board of Directors.

### **ARTICLE IV - Board of Directors**

Section 1. Except as otherwise provided for by law, by the Articles of Incorporation, or these bylaws, the Board of Directors shall exercise the powers of the Corporation, conduct its business affairs, and control its property. The Board is also expressly authorized to make appropriate delegations of authority through management agreements.

Section 2: The Board of Directors shall assume responsibility for setting goals of the corporation, reviewing and approving the Corporation's operational and strategic plans, and evaluating operational and strategic performance. No acquisitions or divestitures shall occur without prior approval of the Board.

Section 3: The Corporation Board of Directors shall be composed of fifteen (15) members.

Section 4: Five (5) members shall be elected each year to serve a three-year term.

a. By April 30 of each fiscal year, the Board of Directors will appoint a Nominating Committee which will be composed of not fewer than three (3) and not more than five (5) persons. Persons who might be considered to serve in one of the five (5) available Board positions may not be a member of the Nominating Committee.

b. By May 31 of each fiscal year, the Nominating Committee will present a slate of candidates numbering not fewer than five (5) and not more than ten (10) persons who are eligible to serve based on membership requirements found in ARTICLE III and who have expressed their commitment to serve as a member of the Board of Directors. In the preparation of the slate, the Nominating Committee shall consider the future composition of the Board of Directors for the purpose of having representation from a broad cross section of the community which the Corporation serves.

c. By June 30 of each fiscal year, the Board of Directors will elect five (5) persons to fill the five (5) available positions.

d. Those elected will begin their service on the July 1 that immediately follows their election.

e. A Board member may not serve more than two (2) consecutive three-year terms.

Section 5. The Board of Directors shall establish attendance, participation and/or ethical standards, and may from time-to-time amend same, by which Officers and Directors will have to adhere to maintain their membership on the board.

Section 6. The Board of Directors may fill an unexpired term of an Officer or Director by a vote of fifty (50%) percent plus one (1) of the Directors in attendance of a meeting at which a quorum is present.

Section 7. A quorum of the Board of Directors will be constituted with the presence of fifty (50%) percent plus one (1) of the Board positions that are filled at the time of a meeting for which proper notice has been served.

Section 8. Notice of a Board of Directors meeting is to occur by written correspondence or facsimile and is to be received no less than seven (7) days prior to the meeting.

#### **ARTICLE V - Executive Committee**

Section 1. The Corporation Executive Committee shall have the full authority to act on behalf of the Corporation Board of Directors if action is required in a time which is insufficient to meet the notice requirement for calling a meeting of the Board of Directors, as found in ARTICLE IV, Section 8 of these bylaws. Otherwise, the Executive Committee shall act as an advisory, recommending body or in other capacities as may be determined by the Board of Directors. Actions taken by the Executive Committee on behalf of the Corporation shall be made known to the Board of Directors within seven (7) days from which the action was taken.

Section 2. The Corporation Executive Committee shall be composed of the following

persons: Chairperson, Vice-Chairperson, Treasurer, Secretary and one (1) at-large member of the Board of Directors.

Section 3. The Board of Directors shall conduct an election to determine the Executive Committee members for the upcoming fiscal year during the period of time that immediately follows the annual election of Directors and the beginning of the new fiscal year on July 1.

Section 4. Persons eligible to serve on the Executive Committee must meet the membership requirements found in ARTICLE III of these bylaws and serve as a member of the Board of Directors.

Section 5. A quorum of an Executive Committee meeting will be constituted with the presence of fifty (50%) percent plus one (1) of the Executive Committee members of which one (1) must be the Chairperson or Vice-Chairperson.

#### **ARTICLE VI - Officers**

Section 1. The Officers of the Corporation shall be the Chairperson, Vice-Chairperson, Treasurer and Secretary.

Section 2. Officers shall serve one (1) year terms and may not serve more than two (2) consecutive terms in any one position.

Section 3. It shall be the responsibility of the Chairperson to call and conduct all meetings of the Corporation Board of Directors and Executive Committee. The Chairperson will appoint, subject to the approval of the Board of Directors, the chairpersons of all Corporation committees. The Chairperson shall be the principal spokesperson for the Corporation and shall represent it at those programs and activities at which the Corporation is to have representation.

Section 4. The Vice-Chairperson shall preside at meetings upon the absence of the Chairperson and shall assure the duties of the Chairperson upon his/her inability to fulfill the duties of his/her office as determined by the Board of Directors. The Vice-Chairperson shall serve as the Corporation's parliamentarian and shall be responsible to the Corporation to insure that the Corporations' business

is conducted in an orderly fashion. Unless otherwise determined, meetings of the Corporation shall be conducted in accordance with Robert's Rules of Order.

Section 5. The Treasurer shall be responsible for providing a regular accounting of the Corporation moneys and financial transactions. The Treasurer shall be responsible for the prudent management of the Corporation moneys and for making the financial transactions necessary to conduct the business of the Corporation.

Section 6. The Secretary shall be responsible for notifying the members of the Board of Directors and Executive Committee of upcoming meetings. The Secretary shall be responsible for recording the actions taken by the Board of Directors and Executive Committee at their meetings. The Secretary shall be responsible for distributing correspondence and other information/material as may be necessary to conduct the business of the Corporation.

#### **ARTICLE VII - Committees**

Section 1. The Corporation Board of Directors shall from time-to-time form those committees deemed to be necessary to conduct the business of the Corporation.

Section 2. Persons to serve as a Committee Chairperson shall be members of the Board of Directors. Committee Chairperson shall serve as result of an appointment by the Corporation Chairperson and approval of the Board of Directors.

Section 3. Persons interested in serving as a member of a Corporation Committee shall be eligible to serve upon meeting the membership requirements found in ARTICLE III of these bylaws. It is not necessary for such persons to be a member of the Board of Directors.

#### **ARTICLE VIII - Staff Services**

The Board of Directors may from time-to-time engage an individual or organization to provide staff services to the Corporation. The Board will provide those so engaged with a scope of work, reasonable compensation, and periodic (not to be less frequent

than once every twelve (12) months) evaluation of the efforts to accomplish the scope of work.

#### **ARTICLE IX - Finances**

Section 1. The Corporation shall use its funds only to accomplish the purpose and objectives specified in these bylaws, and no part of said funds shall inure to the benefit of nor be distributed to the members of the Corporation.

Section 2. The Corporation shall have a fiscal year beginning July 1 and ending June 30 of each calendar year.

Section 3. All moneys received by the Corporation shall be deposited to the credit of the Corporation in such financial institution or institutions as may be designated by the Board of Directors.

Section 4. The solicitation of funds shall not be authorized without prior approval of the Board of Directors.

Section 5. No obligation of expenses shall be incurred and no money appropriated without prior approval of the Board of Directors.

Section 6. Upon approval of an annual budget, the Treasurer or other persons as authorized by the Board of Directors shall have the authority to make disbursements on accounts and expenses provided for in the budget without additional approval of the Board of Directors.

Section 7. Disbursements shall be made by check signed by the Treasurer and one other Officer.

Section 8. The Board of Directors may from time-to-time cause an audit to be conducted of the Corporation's books and accounts. Such audits are to be conducted by a certified public accountant, and upon its completion, the audit report shall be presented to the Board of Directors.

#### **ARTICLE X - Dissolution**

Upon dissolution of the Corporation, any funds remaining shall be distributed to one or more regularly organized and qualified charitable,

educational, scientific, or philanthropic organization as selected by the Board of Directors.

#### **ARTICLE XI - Indemnification**

Each elected or appointed Director or Officer of the Corporation shall be indemnified by the Corporation against all expenses and liabilities, including counsel fees, reasonably incurred by or imposed upon him/her in connection with any proceeding or the settlement of any proceeding to which he/she may be a party or may be involved by reason of his/her being or having been a Director or Officer of the Corporation, whether or not he/she is a Director or Officer at the time such expenses are incurred, except when the Director or Officer is adjudged guilty of willful misfeasance or malfeasance in the performance of their duties. The foregoing right of indemnification shall be in addition to and exclusive of all other rights and remedies to which such Director or Officer may be entitled.

#### **ARTICLE XII - Waiver of Notice**

Whenever any notice is required to be given under the provision of Florida Statute, Articles of Incorporation or these bylaws, a waiver thereof in writing signed by the person entitled to such notice, whether before or after the same stated therein, shall be deemed equivalent to the giving of such notice where such waiver is permitted by Florida law. All waivers shall be filed with the Corporation records or shall be made a part of the minutes of the relevant meeting.

#### **ARTICLE XIII - Corporate Seal**

The Board of Directors may provide for a Corporate Seal in such a form and with such inscription as it shall determine provided such seal shall always contain the words "Corporation" and "Nor-for-Profit."

#### **ARTICLE XIV - Amendments**

These bylaws may be amended, altered, repealed or adopted by a 2/3rd vote of the Board of Directors at a meeting for which proper notice has been provided.

### **Rules for Downtown Farmers' Market of Big Lake, Inc.**

The Downtown Farmers' Market is intended to provide healthy, fresh produce and other assorted nutritional non-commercial foods to the residents of, and visitors to, the community and surrounding area. Both small and large vendors of produce and non-commercial food items will find a supportive outlet for the sale of their goods. The Market will encourage commerce, entertainment and trade in downtown Big Lake, and help display the city's history, uniqueness, charm and potential.

#### **MARKET RULES**

(IMPORTANT: Please read and sign the Market application. Return it, with your exhibit fee, to the Market Manager. Your signature indicates that you have read, understand and agree with the rules.)

#### **VENDOR EQUIPMENT AND SUPPLIES**

Each vendor is responsible for providing and removing any and all equipment and supplies he or she requires to do business on the Market site. This includes signs, tables, chairs, products and equipment utilized for clean-up purposes.

#### **SIGNS**

All signs must remain within the allotted vendor's exhibit space and must not block traffic or pedestrian ingress or egress, or interfere with other vendors' display or views.

#### **EXHIBIT SPACE**

Market management has full authority to assign exhibit space. Requests for particular sites will be given consideration but management reserves the right to assign and locate all vendors. Stall space will be assigned by 3:00 pm on the Friday preceding Market day for all vendors whose fees are paid by that time, and may be confirmed by calling 123-456-7899 between 3:00 pm and 5:00 pm on the Friday preceding Market day. (Please note this number has changed from last year.)

#### **HOURS OF OPERATION**

The Market shall operate every Saturday from 8:00 am - 12:00 noon. (\*\*Please note the times have changed from last year.) All vendors must remain at the Market site until the 12:00 noon closing, and must vacate the Market site by 1:00 pm.

### **SET-UP, CLEAN-UP AND BREAKDOWN**

Set-up starts at 7:00 am and must be completed by 8:00 am. Vendors are responsible for removing all garbage from their stall space area. Stall spaces are to be left in the same condition as when rented. Breakdown starts at 12:00 noon and must be completed, and stalls vacated, by 1:00 pm.

### **PERMIT DISPLAY**

All vendors must display their permit pass in order to occupy a stall site. Permits shall remain on display during Market hours.

### **VEHICLES AND PRODUCT DISPLAY**

Vehicles shall not be utilized as a display or dispensing area for Market goods unless it is a refrigerated unit for perishable items. No vehicle may remain running during Market hours other than for purposes of refrigeration of product. The use of canopies, awning and sun-umbrellas are encouraged.

### **PERMITTED MARKET ITEMS**

Fresh produce, plant items, flowers, baked goods, jellies, jams, preserves, and other non-commercial food items may be sold. No cooking will be allowed on-site. The Market Manager will resolve any doubt as to the suitability of an item. No soliciting or political or religious activities shall be permitted within the Market area. Displays of public interest, such as nutritional, health or consumer information, may be displayed with the permission of the Market Manager. All products must be sold, displayed and stored from a surface above the ground. All vendors must utilize tables, shelves, cases or other structures for these purposes.

**FEES** (All fees are utilized for publicity for the Market.)

Ten-foot x ten-foot (10'x10') stall spaces are \$15.98 including tax per Market day or \$319.50

including tax per Market season (October through April). Spaces with electricity are \$21.30 per Market day or \$340.80 per season. Vendors paying on a per Market day basis must pay their fee by 5:00 pm on the Thursday preceding Market day and pick up their display permit Market morning. Payment on a seasonal fee basis must be made prior to the first Market day of the Market season, as announced by the Market Manager. Seasonal fees may be pro-rated for vendors seeking to rent exhibit space after the Market season has commenced at the discretion of the Market Manager. No reimbursement will be made for fees paid if a vendor decides to no longer participate at the Market. The Market Manager shall consider reimbursement in case of illness or death. Vendors may call the Market at 123-456-7899 concerning Market closure due to inclement weather. Vendors shall be credited for fees paid if inclement weather causes cancellation of a Market day. Fees shall be waived for participants of the Community Gardens Program.

### **MISCELLANEOUS**

Vendors are responsible for collecting and remitting their own sales tax. Vendors are responsible for all permits required by Florida or local County to sell their products. The sale or consumption of alcoholic beverages on the market site is prohibited. All rules may be revised by the decision of the Market Board.

### **ENFORCEMENT OF RULES**

The Market Manager is responsible for enforcing the Market rules. Possible violations will be discussed and resolution attempted. Vendors selling prohibited items will be asked to remove those items from sale or leave the Market. Unresolved problems will be referred to the Market Board. Continued violations will result in being banned from the Market with no reimbursement of fees paid. Any vendor challenging another vendor's product's legitimacy or conduct must file a written complaint with the Market Manager, giving the name of the vendor and the product or situation they feel may not be in compliance with Market policies. The complainant must date and sign their name to the complaint and the Market Manager will attempt resolution. If

resolution is not possible, the complaint will be referred to the Market Board.

## INSURANCE

Vendors are encouraged to consider obtaining individual liability insurance for products sold.

## Farmers' Markets on the Web

### USDA Farmers' Markets –

<http://www.ams.usda.gov/farmersmarkets/> - This website is designed by the USDA to give you a list of farmers' markets in your state, a Farmers' Market Fact Sheet and information about starting a farmers' market. The site also includes a kids section, and a resource and information section.

### Florida State Farmers' Market –

<http://www.florida-agriculture.com/farmmkt/> - This is the Florida Department of Agriculture and Consumer Services website about farmers' markets. It includes links to locations and contacts, a produce availability chart, a cookbook and a nutrition program. The State Farmers' Market mission and overview are also on this site.

### Farmers' Market Online –

[www.farmersmarketonline.com](http://www.farmersmarketonline.com) - This farmers' market is entirely online providing a place for sellers, growers and consumers from around the world to meet, buy and sell. The market sells specialty foods, pet supplies and crafts in addition to traditional farmers' market purchases.

### Pike Place Market –

[www.pikeplacemarket.org](http://www.pikeplacemarket.org) - Pike Place Market, also known as Americas Favorite Farmers' Market, is located in Seattle, Washington. The website offers plenty of shopping ideas as well as a list of which foods are in season and which are not. The site includes an online store and information about getting involved in the market.

### The Original Los Angeles Farmers' Market –

[www.farmersmarketla.com](http://www.farmersmarketla.com) - The website for this farmers' market offers links to information about the history of the market, a market directory, market facts, and news and events. The site was awarded a Time Pick by the *Los Angeles Times* in 1996.

### The Olympia Farmers' Market –

[www.farmers-market.org](http://www.farmers-market.org) - The Olympia Farmers' Market, located in Olympia, Washington, offers a place for local residents to sell their produce, foods and crafts. The site includes a calendar, an online Market News section and a list of market vendors with a description of each vendor.

### Dane County Farmers' Market –

[www.madfarmmkt.org](http://www.madfarmmkt.org) - The Dane County Farmers' Market is located in Madison, Wisconsin. The website offers a tour of the market, a kid's corner, a vendor directory, a calendar and recipes. The vendor directory includes a featured vendor and the kid's corner offers a printable page designed to teach kids about agriculture.

### Dallas Farmers' Market –

[www.dallasfarmersmarket.org](http://www.dallasfarmersmarket.org) - The website lists farmers including a featured farmer of the month. There are cooking classes offered at the farmers' market with information about the various chefs and classes listed online. The website also includes a calendar, the history of the market and a list of community partnerships.

### The Ithaca Farmers' Market –

[www.ithacamarket.com](http://www.ithacamarket.com) - This farmers' market is located in upstate New York. The website includes a question and answer section, a vendor and membership application, a calendar and a picture gallery. Information about the history of the market and directions are also provided.

### The Bellingham Farmers' Market –

[www.bellinghamfarmers.org](http://www.bellinghamfarmers.org) - This farmers' market, located in Bellingham, Washington, runs from April to October of every year. The site lists events during the season, a list of vendors and their email addresses, a vendor application and links to other farmers' markets.

### The Beaverton Farmers' Market –

[www.beavertonfarmersmarket.com](http://www.beavertonfarmersmarket.com) - Located in Beaverton, Oregon, this farmers' market has been recognized by the *Sunset* and *Country Gardens* magazines as an outstanding farmers' market. The website lists the markets' vendors as well as contact information, an online newsletter and a vendor application.



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# Selling at a Farmers' Market

Whether you've been selling at a farmers' market for several years or you're in your first season, you want to make sure you have an eye-catching display that will attract customers.

The following tips will help you get organized, sell all your farm products by the end of the market day and make your trip profitable. Following these guidelines will help make your farmers' market trip as enjoyable for you as you make it for your customers.

- Make sure your display is neat, clean, attractive and inviting, providing ease of movement throughout.
- Give customers a sense of bounty, whether you have a diversity of produce or a single niche product.
- Display all produce and farm products at least six inches off the ground, using sturdy equipment such as wooden boards, inverted crates or bushel baskets, tables or other dispensing equipment.
- Display your products neatly and make them easily accessible to all people, including the physically challenged.
- Incline your containers so customers can see the fruits and vegetables and other farm products easily and from a distance, while simultaneously giving prospective buyers an impression of choice and abundance.
- Post product and price signs above every display container or on a blackboard, indicating clearly and legibly the unit price and product variety.
- Make better use of vertical display space by using portable fixtures that allow customers to see the products from elbow to eye level.
- Replenish the containers as they get empty. Bring a range of different-sized containers to the market so you can put your products into smaller containers as quantities diminish.
- Create eye appeal by using contrasting colors, sizes and shapes as you display your vegetables, fruits, and other products.
- Bring only your highest quality products to market, clean and harvested at their optimum maturity and freshness.

## **When preparing for market day, consider bringing the following:**

- Crushed ice or a spray water bottle to keep crops such as lettuce, mesclun and broccoli looking fresh.
- A cooler to ensure safe storage of meat, poultry, eggs and other perishables.
- An appliance thermometer in the cooler to monitor temperature; maintain temperature at 41 degrees Fahrenheit or below.

- Drinking-quality water for misting sensitive vegetables, for drinking and for washing your hands.
- Paper towels and soap.
- Signs.
- Farm business sign.
- Price and products signs.
- Other signs or posters.
- Products price list.
- A white or beige canopy, tent or umbrella to define your sales area and protect farm produce and products from the elements.
- Portable displays such as tables, sawhorses, wooden boards, shelves, etc., on which to display your produce and other products.
- Sandbags or other weights to anchor your table, canopy, fliers, etc. in the event of wind.
- Tablecloths to dress up your table displays and hide the extra inventory and other items.
- Clean and undamaged containers such as wooden or wicker baskets, crates, bushels, etc.
- Fabric or plastic container liners to keep fruits and vegetables free of bruises.
- Plastic or paper bags, new and sturdy.
- Cash box with change and small bills.
- Receipt book and calculator.
- Licensed scale, if you choose to sell by weight.
- Cellophane paper/plastic and rubber bands to cover small fruit containers.
- Florist sleeves, if you are in the cut flower business.
- Bakery cardboard boxes for fruit or poultry pies or dumplings and other value-added products.
- Shopping baskets – a great convenience for customers, allowing them to purchase more products.
- Fliers about your farm: include information about what you sell, recipes, a picture of your farm, contact information.
- Business cards.
- Anti-fatigue mats and a stool for you to rest on if you need some support.
- Blackboard.
- Clipboard, extra paper and pen to write any comments, notes or customers' feedback.
- Heavy paper and marker pens for making new signs if needed.
- Adhesive tape or staple gun (with extra staples).
- First-aid kit.

### **Make sure your sales crew**

- Understands the importance of hygienic practices such as washing their hands after using the bathroom.
- Knows about your farm operation and farm products.
- Is well informed about handling, storing and using each of your products.
- Wears aprons, T-shirts, or caps with your farm name or logo.
- Appears neat and well groomed.
- Is full of enthusiasm, with genuine smiles.



## **Other things to consider**

### **Insurance:**

- Product liability insurance is recommended. Also, make sure your liability insurance is adequate for selling at the farmers' market.

### **Safety:**

- Keep your dog at home. Hopefully your customers will do the same
- If the market chooses to have farm animals on site as an attraction, make sure the animals are there for visual effect only and not for petting. Food safety and people's safety should be your primary concern.

### **State and Local Regulations:**

- To certify weighing scales: For more information contact the New Hampshire Department of Agriculture, Markets & Food (NHDAMF) <http://www.state.nh.us/agric/aghome.html> Bureau of Weights & Measures: 603-271-3700
- For a General Permit/Restricted Pesticide Permit (required if you use organic or synthetic pesticides on the crops you sell), contact NHDAMF Division of Pesticide Control: 603-271-3550.
- For processed foods such as jams & jellies, cheese and bottled milk, contact the New Hampshire Department of Health and Human Services, Bureau of Food Protection at 603-271-4589 or 1-800-852-3345 Ext. 4589 <http://www.state.nh.us/gencourt/ols/rules/he-P2300.html>

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# Selling Strategies for Local Food Producers

Division of Applied Social Sciences

For many farmers, marketing and selling their products are the most challenging parts of the farm enterprise, especially when selling directly to consumers. However, direct markets for fresh and unique food products are among the most rapidly growing farm opportunities. People around the country are looking to buy tasty, healthy food directly from farmers — farmers with whom they can talk, ask questions and build relationships. However, these new market opportunities, particularly in farmers' markets, community supported agriculture (CSA), roadside stands, restaurants and cooperatives, require expertise in selling as well as marketing, production and financial management.

In any business, marketing and selling go hand in hand. Marketing describes a range of activities that include deciding what to produce and how to price, distribute and promote a product. Selling, on the other hand, describes the techniques used to entice buyers to exchange their cash for the seller's products. Despite the images that many people hold of pushy "salesmen" who won't take no for an answer, or the "natural-born salesman" who gets people to buy products without much effort, developing strong selling skills is critically important to acquiring and keeping customers in a direct marketing enterprise. And, while many farmers may be intimidated by the idea of selling, it is important to remember that selling skills — just like other skills — can be learned.

The selling techniques described in this guide are customer-friendly and ethical. There is no advice on how to trick or manipulate customers, or how to get customers to buy something they don't really need. Rather, the guide provides practical advice on how to



## Checklist: Are you ready to sell?

Being prepared to sell is essential. You should have the basics covered before you open for business or make a sales call.

- Product quality:** Is your product fresh, clean and ready for sale? Are samples prepared?
- Price:** Is your product priced fairly and competitively? Is your price list accurate and up-to-date?
- Display:** Is your display neat, accessible and attractive? Are prices clearly marked? Is the name of your farm displayed on boxes, banners or signs?
- Supplies:** Do you have plenty of shopping bags. Do you have enough cash to make change? Is your scale in good working order? Are farm pamphlets and recipes available?
- Personal appearance:** Are you clean, neat, well dressed and well groomed?
- Attitude:** Are you proud of your products and what you do for a living?
- Service:** Are you ready to be personable and helpful? Do you have a plan for handling complaints? Do you have a good invoice system?
- Gratitude:** Are you thankful for your customers and the opportunity to serve them?

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## Understanding nonverbal communication

Waving “Hi” to a neighbor; slouching in a chair; looking intently into the eyes of a loved one. These are all ways that we communicate without using words.

Nonverbal communication takes many forms and can convey diverse meanings. However, its significance is often overlooked. Nonverbal communication can actually convey more meaning than verbal communication. Researchers estimate that at least 60 percent of the impact of a conversation or message comes from nonverbal factors such as eye behavior, gestures, posture and voice.

Your relationships with customers can be enhanced by not only having an awareness of the ways messages are conveyed nonverbally, but by taking steps to improve your nonverbal communication. Consider the following suggestions from *Successful Nonverbal Communication*, by Dale G. Leathers (1986):

- Try to sustain eye contact with customers when serving them or having a conversation with them. Avoid shifting your eyes too much, or looking down or away from customers.
- Keep hands and elbows away from your body. When listening to customers, nod your head and smile. Avoid fidgeting, handwringing and touching your face.
- Keep an open and relaxed posture. Lean forward slightly. Avoid crossing your arms and standing rigidly.
- Speak at an appropriate volume and rate. Vary your pitch. Avoid speaking in a monotone, using too many pauses and “ahs,” and repeating words.

increase sales by building a loyal customer base. The guide is organized around a counselor approach to selling outlined in the book *Win-Win Selling* (Wilson Learning Library, 2003) and takes readers through the process of (1) building relationships with customers, (2) discovering customers’ needs and preferences, (3) being an advocate for one’s products, and (4) providing quality service. While much of the information in this guide is focused on selling at farmers’ markets, the tips are appropriate for anyone wishing to sell their products directly to consumers.

## Before you start

Selling is just one part of a successful direct-marketing business. Good production skills and superior postharvest handling techniques can ensure high-quality products that command premium prices. Likewise, a thorough knowledge of your farm’s financial condition can ensure that you employ the right pricing and advertising strategies to gain the most profit.

Being aware that you are competing with supermarkets and other farmers at your market or in your particular region can also help ensure success. At the end of the day, you want customers to spend more of their dollars with you. This means that you have to constantly improve your skills and look for competitive advantages to keep your business profitable.

Although the topics of product quality, farm finan-

cial planning, pricing and merchandizing are beyond the scope of this guide, you can find a host of resources on these topics in the “Resources” section at the end of this publication and through University of Missouri Extension publications and county offices (On the Web: [extension.missouri.edu](http://extension.missouri.edu)).

## Build relationships with your customers

In any business, building relationships with customers is key. This is even more important in the world of direct marketing. However, building relationships with customers takes time and depends on being personable and paying attention to a few basic details. The following suggestions are offered to help you make a good first impression and begin the process of building a loyal base of customers.

### First, pay attention to your personal appearance.

Consciously or unconsciously, customers often base their purchasing decisions on their first impression of you. Be clean, neat, well dressed and well groomed. Dirty clothes and hands, stubby beards and unconventional tattoos and piercings can all turn off certain customers. This doesn’t mean you have to wear your Sunday best when selling. On the contrary, a clean pair of blue jeans and a fresh shirt are acceptable attire for farmers. Also consider wearing a name tag or having your farm logo inscribed on shirts and hats.

**Second, engage customers as soon as you can** at the market so they don’t have the opportunity to go somewhere else. Always stand rather than sit. Make eye contact with customers and avoid wearing sunglasses if possible. Smile. Say “Hello” and “How are you today?” The idea here is to be inviting and make it easy for customers to visit your stand and get to know you both as a farmer and as a person. When customers do visit your stand, make an effort to learn their names and something about them. This allows you to address them by name and strike up casual conversation when they revisit your stand. When working with chefs, do some homework to learn their names before you make



your first sales call. If the market is slow, keep busy by polishing fruit, straightening the stand, or passing out samples, or consider having a partner in front of the stand to draw people in.

**Third, be reliable.** Show up on time, keep regular hours and have adequate supplies of your product. It is hard for customers to trust you if they don't know when you're going to be at the market, when you're going to arrive with a delivery, how long you'll be open for business or how much product you'll have. If you are trying to sell to a restaurant, reliability is a key factor in gaining and maintaining your customer. For instance, if a hailstorm wipes out your spinach, or deer season closes down your meat processor, make sure to tell the chef as far in advance as possible that you won't be able to deliver their order. With advance warning, chefs may be able to take the lack of product in stride and still continue to order from you. Without it, you may lose the entire account.

**Fourth, share your knowledge** about your products and skills. Customers are often interested in the nutritional value of different foods, how they are grown or processed, or what makes your offerings special. This is especially important if you sell specialty or ethnic products. Customers also appreciate hearing about how your products are used by other satisfied customers.

**Fifth, go the extra mile for customers.** Offer to carry or cart-out purchases. Allow customers to leave purchased items at your stand until they've completed their other shopping. Always try to deliver more than the customer expects. Give away something extra or throw in a sample of a new product to regular customers. These and other services demonstrate your commitment to your customers and show them how much you appreciate their business.

**Finally, be pragmatic and have a sense of humor.** It is guaranteed that you will not satisfy everyone all of the time. Placing reasonable expectations on yourself and others, and being able to laugh at yourself on occasion, will allow you to keep a good attitude and attract customers to your business. Also, if you really don't believe that you are outgoing enough for direct marketing, find someone in your family or hire someone who is. Remember to take the time to educate them about your products and the importance of providing great customer service.

## Discover your customers' needs and preferences

Discovering the needs and preferences of customers takes time, patience and a good ear. It also follows naturally from a commitment to building relationships with customers and getting to know them on a more personal level.

For instance, you might arrive at market with a

truckload of the best yellow-fleshed watermelon in the county, but if the customers at your market are not familiar with this variety, then you are likely to *leave* the market with a truckload of yellow-fleshed watermelon.

Finding out what customers want can be achieved in a couple of different ways. First, when talking to customers, ask questions about their preferences. For instance, ask questions such as, "Are you looking for anything special today?" or "Are you preparing any special meals this week?" If a family is shopping with their children, ask the kids, "What's your favorite vegetable?" You can also relate your products to the season or upcoming holidays by asking, "Are you planning to do any canning this year?" or "Will you be cooking out for the Fourth of July?" Listen carefully to what customers say. If you are taking orders, restate the customer's order to be sure you heard them correctly. Keep a notepad and pen nearby to record orders, comments and special requests.

Second, do some homework. Spend time at the library or on the Internet researching the latest consumer trends, particularly by reading lifestyle magazines (e.g., *Martha Stewart Living*, *Oprah*, *Real Simple*). Look for information about the types of products you

### Building relationships with chefs

When selling to chefs, it may be even more important to invest time in building strong relationships, in part because you stand to gain or lose a higher volume of sales than with an individual customer at the farmers' market. It can also take more time to establish relationships with chefs. You may have to make 10 or visits or telephone calls to an establishment before the chef starts to take an interest. Being persistent (in a polite way) can pay off.

Once a chef is interested, schedule a meeting well before the start of the season to determine his or her needs. Ask a few questions, such as:

- "What is your favorite meal to prepare?"
- "What are some of your best-selling items?"
- "Are there any products that you would like to source locally?"
- "Are there any hard-to-find or highly perishable products not available from your current distributor?"

Take a seed catalog with you and review it with the chef to determine which products they want. Provide samples of your highest-quality products for the chef to use at home or in the restaurant. Talk about your best-selling products at market and ask the chef if they are interested in the same ones.

When setting up a meeting with a chef, keep in mind that chefs have different schedules than farmers. Chefs are extremely busy during meal times and will not welcome interruptions. If you call on a chef specializing in the lunch business at 11:30 a.m., you will lose the sale. The best time to call or drop by is midmorning, generally before 10 a.m., or in the afternoon, around 2:00 or 3:00 p.m., after the lunchtime rush is over and before the dinner hour starts.

### Top 5 annoyances for farmers' market customers

- 1 Vendor takes or makes cell phone calls while serving customers.
- 2 Vendor chats a long while with other vendors or customers who have been helped while others are waiting.
- 3 Long line has formed at the vendor's stand — most customers won't wait.
- 4 Vendor fails to acknowledge waiting customers.
- 5 Vendor cannot make change.

sell. Stay abreast of the latest developments in direct marketing and farming. This information, along with what you learn directly from your customers, can be used to adjust your product selection to better meet your customers' needs.

### Be an advocate for your products

Once you've developed a relationship with your customers and have a good idea of what they're looking for, it's time to match their needs with your products. Your goal here is to create a partnership with your customers rather than try to sell them something they don't need.

Try to find a balance between sharing information about your products and socializing with customers while at the market. Talking about the nutritional qualities of your products or how to store, preserve, and use your products is a great way to promote them. With chefs, talk about the ease of using your products in the restaurant, or their unique flavors and qualities. For instance, you might talk about the rich flavor of your grass-fed meat, or how well your egg yolks hold up when frying them sunny-side up. Keep in mind that while most people are interested in receiving some information, they don't necessarily have the time to sit through a lecture at the market or in the restaurant. Keep the conversation light and friendly. Passing out informational fliers is an additional way to share information.

Sharing recipes is another great way to promote your products, especially if they are new or unique. People are generally interested in simple, seasonal recipes with only a few ingredients. Recipes can be gathered in the off-season and printed on tear-off note pads with your farm logo and contact information.

Offering samples is a great way to introduce new or in-season products. When sampling at a farmers' market, be sure to consult with your local health department or the market bylaws regarding sampling rules. Generally, samples should be fresh and served in individual cups on a covered tray. Keep a trash can nearby and always use sanitizing water to clean knives and cutting boards between uses. When providing samples to chefs, take small quantities of your product to the restaurant with some information about your farm.

Try to have a brief conversation with the chef if possible. Check back a week later to see if the chef liked your product and is interested in doing business with you.

Make signs or announcements to let customers know about products that will be available in coming weeks. A simple sign can read, "Fresh shiitake mushrooms available next week. Special price: \$3.00/¼ lb. while supplies last." Or, as customers leave with their purchases, you might say, "Next week we'll have our first harvest of oyster mushrooms. Be sure to visit our stand early because we'll only have a few pounds to begin with." Give customers a reason to visit your booth again and the opportunity to become preferred customers. Also, if you sell many different products, consider offering a weekly special at a reduced price. Everyone likes to feel like they are getting a deal. This information can also be conveyed using signs or announcements. A sign might read, "This Week's Special: Winter Squash, 2 for \$5.00." Or, you might say to customers: "We have a special on #2 canning tomatoes this week. They're slightly blemished but will make great sauce or salsa. Here's a copy of our family's salsa recipe."

Don't be afraid to put a little flair into your presentation. Wear a costume or make periodic announcements to passersby about new or special products. Be sure to use discretion though, and be considerate of other vendors and shoppers.

Finally, remember to ask for the sale. Be specific rather than general. Assume the sale by asking questions that will make a sale regardless of the answer. The best questions include two choices with no negative outcome (i.e., no loss of sale). For example, rather than asking, "Would you like to buy some eggs?" say "Would you like just a dozen eggs this week, or would you like to take an extra dozen to have on hand?" Other examples: "Would you like 2 or 5 pounds of tomatoes today?" "How many pounds of beans can I get for you today?" "Would you like the green peppers or the red peppers or both?" When talking with a chef, you might



ask, “What day of the week would be best for me to deliver your order?”

Assuming the sale can be done subtly. If a customer is wavering between two products, say something like “How about getting the fresh spreadable cheese for using on toast, *and* this aged cheese that you can sprinkle over salads?” In this example, there is a greater chance the customer will buy two items from you, rather than one.

If you ask for the sale and it doesn’t happen, then you may need to make another attempt to discover your customers’ wants and needs. Remember though, to increase your sales, you ultimately must ask for the sale — many sales don’t happen without it!

### Creating printed and online materials

Many farmers involved in direct marketing have invested time and energy in communicating with customers through printed and online materials. This is great way for farmers to enhance their relationship with customers and demonstrate the unique qualities of their farm and farm products.

Before starting, consider creating a unique “brand” for your business or product, if you don’t already have one. Combine the name of your farm or a special product name with a unique type style and color scheme to create a logo. Once you’ve created this design and identity, use it consistently on all printed and online materials. Customers are more likely to remember you if you have a strong and consistent identity.

Below are suggestions of different types of materials to consider, many of which can be created using basic word processing or publishing software.

- **Farm pamphlet or brochure:** Include pictures, a farm history, a statement of your farming philosophy, products, and a harvest calendar.
- **Coupons:** Create a double coupon that gives the customer a discount on their next purchase from you, and also includes a discount for one of their friends to purchase from you. Include the coupon with every purchase and vary it from week to week.
- **Weekly or monthly newsletter:** This is a great way to update customers about new products and developments on your farm. Include seasonal recipes, along with food storage and preservation tips.
- **Informational fliers:** Consider creating a ½- to 1-page handout on a range of topics such as nutrition, cooking, storage and preservation tips, classes, events, contests, history and origins of select food crops, relevant news stories and policy issues.
- **Web site:** Take your farm to the Internet and combine all of the options above in one place. However, having a dysfunctional Web site or failing to promptly respond to web requests may be worse than having no Web site at all. If needed, seek help from a professional web designer or web manager.

For assistance with printed materials, marketing, and promotion, contact Lane McConnell, Marketing Specialist, Missouri Department of Agriculture, Telephone: 573-526-4984, or e-mail: Lane.McConnell@mda.mo.gov.

## Provide quality service

You may be familiar with the following adage: a *satisfied* customer will tell fewer than five people about your business, but a *dissatisfied* customer will tell at least 10 people. This demonstrates two important points. First, satisfied customers are an essential part of any business. Second, word-of-mouth publicity can make or break a business. With this in mind, it is important to focus on strengthening relationships with existing customers by providing outstanding service.

Once the market opens, serving customers should be the first priority. All other activities, such as conversations with other vendors or rearranging the display, should wait until the customer is served. Also, be sure to thank customers as they leave and make it clear that all products are guaranteed.

Providing prompt service is also important, especially during busy times. However, try to give each customer the time they deserve. Develop a way to serve customers in order and acknowledge customers who are waiting in line. Make eye contact with waiting customers, tell them that you’ll be with them in a moment, and thank them for their patience. If possible, offer waiting customers a sample or a pamphlet about your farm. When selling to chefs or other direct customers, return phone calls within a minimum of 24 hours to avoid losing the sale. Consider hiring employees, recruiting family members or prepackaging items for extremely busy periods.

Address any post-sale dissatisfaction politely and promptly. And, whatever you do, avoid arguing with customers. Acknowledge all complaints, apologize and take appropriate steps to remedy the complaint. It is sometimes helpful to ask customers how they would like a situation resolved. Once the complaint is resolved, thank the customer for bringing the complaint to your attention and make a note of the complaint for future reference. Keep in mind that it takes more energy and effort to gain new customers than it does to keep existing ones. Even when a customer has a negative experience, they will likely return to purchase from you again if they feel their complaint was resolved in an appropriate and timely way.

Providing good service is particularly essential for restaurant customers. Samples can introduce your product to a chef, but they have to be packaged well and contain enough of your product so that the chef can experiment. Good packaging will allow the product to show visibly if possible, will be consistent from package to package, and will be standardized by weight or count, so a chef can confidently order the necessary amount. (While one chef may appreciate receiving great spinach in a black garbage bag, most chefs won’t even open the bag.)

You will also need to include current, easy-to-read price lists with samples and any printed materials you leave with the chef. Price lists can introduce new prod-

### Can you learn to be a good salesperson?

Anyone can learn to be a good salesperson. Those who naturally excel at selling will enjoy working with a wide variety of personalities, have excellent interpersonal skills and enjoy thinking creatively about positioning or placing their products. They will pay attention to detail and be comfortable when customers don't want their product or don't return their sales calls.

For others, learning to be a good salesperson may take time and attention. Initially, it may require making an extra effort to be outgoing and start conversations with customers. It might also require a commitment to using the resources in this guide to develop the selling skills needed for a successful direct marketing enterprise.

Additionally, it's important to remember that all farm enterprises require broad sets of skills in production, marketing, financial management and selling. Most farmers shine in one or two areas and struggle with the others — only mythical "Super Farmer" can master all of them. Farmers who know all about producing and harvesting high-quality products, and understand exactly how profitable each of their enterprises is, may be completely intimidated by the idea of marketing and selling their products. Or, someone who knows how to market well and produce great products may find it very challenging to determine which of their crop or livestock enterprises make them the most money.

Because developing expertise in all skill areas is generally not easy, direct marketers should honestly evaluate their talents and skills, take strides to develop broad skills in areas that need improvement and seek help from other farmers, workers or family members who possess expertise in particular areas.

ucts to the chefs, especially if you highlight the variety of products you have available. Part of providing good service is making it easy to order your product. Some chefs will place their orders after their dinner service closes, which means you are likely to lose the sale if you can't take e-mail or Internet orders.

Products will need to be delivered on a regular basis, at predetermined times, when it is convenient for the chef. Since chefs have limited storage on-site, delaying your delivery by even a day can disrupt the restaurant's menu and damage your relationship. You will also need to include a separate, legible invoice with any products you deliver. Invoices are usually passed to the bookkeeper, who has to be able to understand the information to process a timely payment.

### Beyond the basics

Although providing outstanding customer service is a proven way to build and strengthen relationships with existing customers, there are additional ways you can improve service.

First, when interacting with customers, find other products to sell them. Take note of what they have in their shopping bags or on their restaurant menus and offer complementary items. Remember their previous

purchases, ask them how they enjoyed those items, and ask if they'd like more. If customers are looking for items you don't carry, recommend other vendors who do carry those items.

If you see a regular customer carrying a competitor's product, offer a sample of your own product with an appropriate promotion to bring them to your stand next week. For instance, "I see you purchased some tomatoes down the way. I've planted this really great variety this year that I think you'll like. Try this one at no charge, and if you like it, come back next week to see me."

Second, consider creative ways to communicate with customers throughout the year. Many farms use newsletters, pamphlets, informational brochures, coupons or handwritten letters to stay in touch with customers. Create a mailing list by collecting customers' contact information from checks or a guest book. Mail printed items or e-mail electronic versions, depending on your customers' preferences.

Third, think about hosting events, classes or contests. An open house or farm tour is a great way to show appreciation for customers. Sponsor free classes on preserving foods. Partner with a local chef to offer tasting parties or cooking classes. Have a drawing or recipe contest.

Finally, make a concerted effort to evaluate and improve your service. Record yourself during busy times with a video or audio recorder. Listen to and watch other vendors. Tour other markets, visit other roadside stands, or go to the supermarket to check their selection, display and prices. Put yourself in the customers' shoes and think about your business from their perspective. Some businesses measure customer satisfaction through customer surveys, meetings with customers, or customer complaints and compliments. The goal is to reflect on both successes and failures and be willing to change.

### Summary

Being successful in direct marketing takes a great deal of time, effort and attention. It requires not only the ability to produce a quality product, but also the commitment to build lasting relationships with customers. It also takes a combination of skills, and ideally a group effort, to create a lasting, profitable enterprise.

However, marketing directly to consumers also has many rewards. As a farmer, you are able to gain greater control over both production and marketing decisions. You have the opportunity take advantage of unique marketing opportunities and earn retail prices for your products. You also become a valued member of the community and gain satisfaction from both your work and the relationships you build with community members.

The authors acknowledge the assistance of John Emery, Lane McConnell and Ann Wilkinson in the preparation of this guide.

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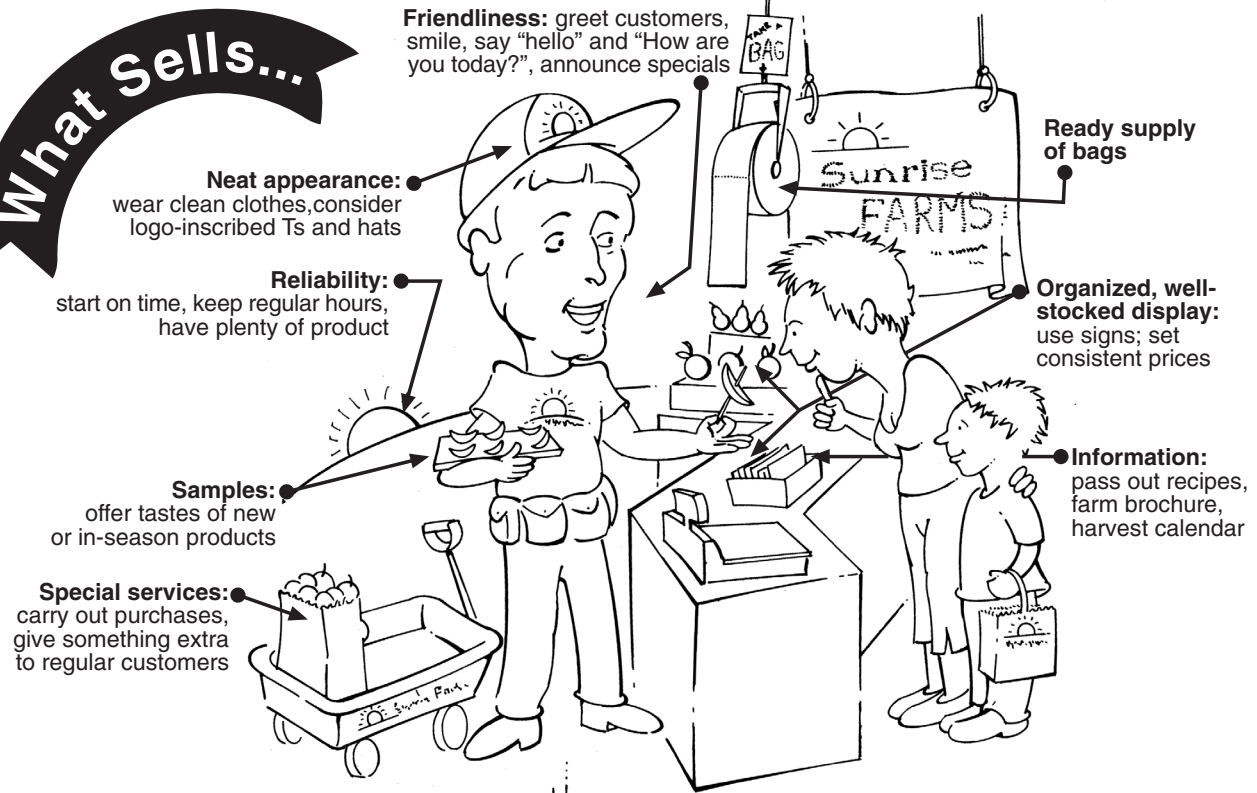
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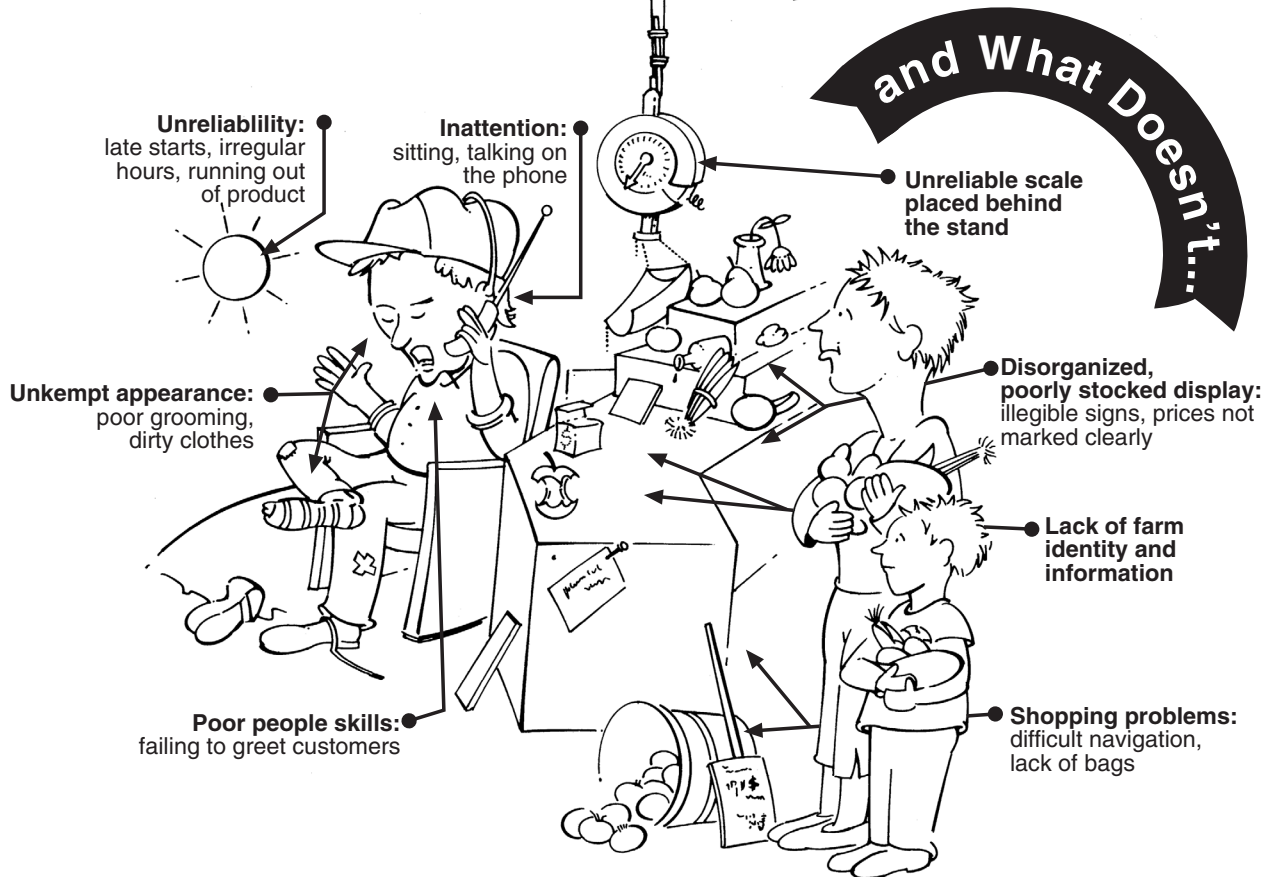
University of Missouri Extension Publications. Many publications are available for free online at [extension.missouri.edu/explore](http://extension.missouri.edu/explore). Others are available for order online at [extension.missouri.edu/explore/order.htm](http://extension.missouri.edu/explore/order.htm), by phone at 573-882-7216 or 800-292-0969, or by mail at 2800 Maguire Blvd., Columbia, Mo. 65211.



# What sells...



# and What Doesn't...



# Fee Hunting and Fishing



UNIVERSITY OF ILLINOIS  
**EXTENSION**

College of Agricultural, Consumer and Environmental Sciences



# **FEE HUNTING**

*Opportunities for Farmers and Rural Landowners*

University of Illinois ~ U.S. Department of Agriculture ~ Local Extension Councils Cooperating  
*University of Illinois Extension provides equal opportunities in programs and employment. 2007*

*Written by John Pike, University of Illinois Extension, Community and Economic Development Educator*

Farmers and rural landowners throughout Illinois are generating new profits by meeting the growing demand for the privilege to hunt on private property. But before entering into a fee hunting arrangement—whether leasing land or developing a commercial outfitting business—you need to consider all the factors and options with this type of enterprise. Due to the individual nature of these business arrangements, it is highly recommended that all parties involved with a hunting lease consult with their attorney, insurance agent, and other business advisors before granting access, or making or accepting payment for hunting privileges.

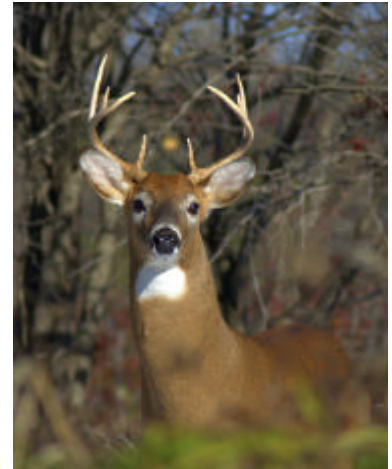
## WHAT'S DRIVING FEE HUNTING?

The demand for fee hunting opportunities has been on the rise. The main factors include inadequate profit from traditional commodity production, efforts to use all of the farm's resources and, in some cases, the opportunity to develop a personal hobby (hunting) into a profitable business. While the income potential varies depending on farm location, topography, local wildlife habitat, and activities being conducted on surrounding properties, most farms do have some marketable possibilities. It is important to keep in mind, however, that even though wild game may seem abundant on the majority of Illinois farms, all farms are not necessarily premium hunting locations.

Another factor driving the development of fee hunting is demand. More and more hunters are actively seeking out private land for recreational purposes. For this reason, landowners are often approached by potential customers long before they investigate the possible options involved with leasing their land or starting an outfitter business on their own. Many landowners initially question why people would pay to hunt on private land when there are thousands of acres open to public hunting.

But, the opportunity to hunt on private land often provides hunters with a less hectic, higher quality hunt that is not so dependent on the actions of other hunters who can interfere with the experience. Whether the hunters are involved with a full-service guided hunt offered by a commercial outfitter or involved in a private hunting lease, paying for the privilege to hunt on private land can offer a higher likelihood of success in a more relaxed atmosphere.

For many hunters, this peace of mind carries a high value. Because of the growing demand from a diverse customer base, farmers need to realize the true value of what their land currently offers, or more importantly, what it could be worth if managed properly.



Landowners often say, “I wouldn’t pay to hunt on my land, so why would anyone else?” or “We really don’t have a lot of trophy game on our farm.” But, landowners need to look at their situation from a potential customer’s point of view. Although the majority of farm owners have regular access to wildlife and nature, they need to realize that many citizens do not enjoy the same privilege on a regular basis.

In other situations, location is the key. For example, deer are bigger, and waterfowl is more abundant in certain parts of Illinois than in other states. As a result, what is considered to be an “average” hunt in your area might rank as the *hunt of a lifetime* for a hunter from another part of the country.

Also remember that hunting is enjoyed by a broad range of people . . . white-collar, blue-collar and “no-collar.” Those with higher incomes might take multiple hunting trips during the course of the year or seek out the most premier leases. But, even hunters with a modest income will save up for the yearly *hunt of a lifetime*. For these reasons, there is an opportunity to capitalize on hunter demand, and everyone involved can benefit.

## OPERATIONAL OPTIONS

Generally speaking, there is a market for about any type of hunting arrangement that a landowner might be willing to offer. From seasonal leases with individuals or groups of hunters, to building a full-service outfitting business, there are many good examples of successful fee hunting businesses throughout Illinois and other regions of the country.

Landowners have been enticed to maintain or improve wildlife habitat on their farms to maximize the hunting value. In many cases, habitat management and selective harvest of some game species, especially deer, have increased wildlife populations and hunter success. Keep in mind that, for many hunters, the successfulness of the hunt is measured by much more than harvesting game. Being surrounded by nature and sharing time with other hunters before and after the hunt are also important factors when evaluating fee hunting options.

While profit potential attracts the interest of many landowners, only a few want to operate a commercial hunting or outfitting business. And even though many properties have the potential to generate some profit from hunting or other recreational uses, the income produced in most situations is supplemental at best. It takes either a true entrepreneur or a premier hunting site to capture the highest returns that are frequently quoted through the “rumor mill.”

### *Leasing Hunting Land*

In most situations, simply leasing land to an individual, group, or even another outfitter has been the best option. Two important factors that need to be considered from the start are liability and determining a fair value for the lease. (Liability is discussed in the next section.)

Prices for hunting leases vary widely, so you need to do some research prior to advertising or entering into a lease agreement. Prices for hunting leases will vary depending on farm size, agricultural practices, abundance and quality of game, habitat enhancement, reputation of the parcel as well as the general region, practices and activities on neighboring properties, and many other factors. Realtors, bankers, farm managers, Farm Bureau managers, university Extension personnel, and NRCS staff can help assess the price range for hunting leases in about any area.

There are also several websites that advertise available leases by state and, in some cases, even by county. The information from these sites can be useful, but it may be difficult to find an exact comparison. One of the firms that hosts a website to put landowners in contact with hunters interested in leasing land also employs field representatives who

will inspect land to determine how desirable the property would be in the lease market. These field reps then work with the landowner to determine what a fair price might be.

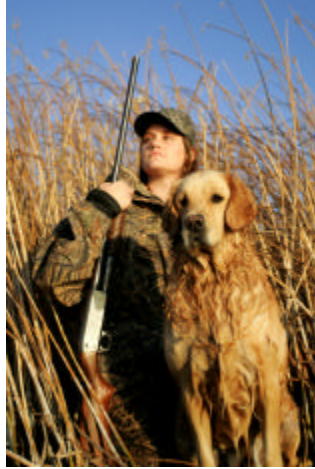
Remember that what is deemed to be a “fair” price is not always the highest price. There are situations where high-quality hunting land is being leased at what seems to be bargain prices; but, in these situations, landowners often value doing business with people with whom they have had a long-standing relationship and those whom they know will respect and look after the property as if it were their own. In other cases, land of moderate hunting quality might be leased at a premium price because of its convenient access or some other attribute that appeals to the hunter’s needs or desires. Marketing efforts can also play an important role in the value of a hunting lease.

### *Starting a Commercial Hunting Operation*

Rather than leasing land to other hunters, some landowners have chosen to develop commercial hunting clubs and outfitter businesses on their farms. In these situations, the operator is involved in much more than merely offering access to the property. In most cases, services such as lodging, meals, guide services, game processing, and transportation are offered. As a result of the added services, the revenue potential is usually higher; but, the ability to offer the services comes as a result of an investment over and above owning the land. These added investments can be quite expensive depending on the facilities, equipment and personnel involved.



If you are interested in starting a commercial operation, you need to develop a business plan to determine whether sufficient revenue can be generated to cover the added costs and provide a profit. It takes time to establish a business reputation and a loyal clientele, so you'll need to develop a strategy to build the business over time. Large investments in amenities such as lodge facilities should generally be viewed as long-term goals. Many of the most successful hunting club operators and outfitters in Illinois have "rustic" accommodations, but they generally go all out where habitat and customer service are concerned.



To avoid large investments in the early stages of this type of business, some hunting club operators work with existing businesses in the community to provide lodging and meals. This way, the hunting club operator can offer a full service package to clients, avoid risky or unnecessary investments, and benefit local businesses at the same time. In some cases, the hunting business may grow to the point where it might be feasible to invest in a facility of its own; in other cases, it may be more beneficial to continue working with local hotels and restaurants and invest in other assets to expand the business.

*Those interested in establishing or operating a commercial hunting business should investigate licensing requirements. This information is available through the Illinois Department of Natural Resources (IDNR), <http://dnr.state.il.us/>, 217/782-6302. Although all fee hunting arrangements do not require special licensing from IDNR, leases and commercial hunting operations involved with waterfowl will likely require licensing, and licensing provisions are also in place to regulate deer and turkey hunting outfitters. It is highly advisable for landowners to determine licensing requirements as part of the planning process.*

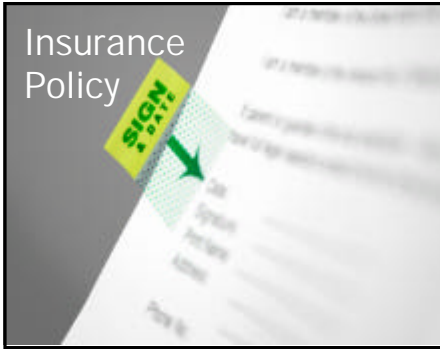
## LIABILITY

Liability is an issue that is usually at the forefront of concerns when fee hunting is considered. While the recognition of liability is generally a good thing, it is often misunderstood through false assumptions or a lack of understanding about how the insurance industry works.

Because fee hunting enterprises are often started as a sideline business to an existing farm operation, it is often assumed that liability issues related to fee hunting would be covered by the existing farm liability policy. The logic is that since the business is being conducted on the farm, it is part of the farming operation. While this could be the case, business operators should always check with their insurance agent prior to conducting any new business activity. Usually, farm liability insurance only covers activities involved with "typical" or "traditional" farming practices. Although the definition of a farming practice will vary from company to company, it is probably safe to say that activities such as charging the public to visit your farm to hunt wild game is not part of that definition and not covered by most general farm policies.

Securing adequate insurance coverage is no easy task. Since no two fee hunting arrangements are alike, it is difficult for the insurance industry to assess the true risk associated with these ventures. To compensate for the unknown, the companies often have to charge high rates or refuse to provide coverage at all. For companies that do provide liability coverage for fee hunting businesses, it is normal for premiums to be based on the expected revenue that will be or has been generated by the operation. It is important to keep this in mind when discussing insurance issues with others involved in fee hunting as the rates quoted from these sources will probably not be comparable to your situation.

The best advice for obtaining liability coverage for your hunting enterprise is to allow plenty of time for planning and investigation. Start with your current insurance agent as the first source of advice. Get several quotes and network with others in the industry to learn from their experiences.



In most cases, it is possible to find affordable liability coverage for the majority of proposed fee hunting ventures, but it

might take significant effort to identify the best solution for each situation.

While you want to be certain that you have adequate liability coverage, it is not always necessary that you secure the policy. If you are involved in operating a commercial hunting or outfitting business, commercial liability coverage will likely be a necessity. But in cases where your land is being leased to an individual hunter, group, or outfitter, you could require that the lessee provide their own liability insurance.

This responsibility should be explained in a written lease agreement. In these instances, it is recommended that the lessee provide the lessor (landowner) with a copy of the insurance policy to be reviewed by the lessor's business advisors (insurance agent and/or attorney) **before** signing the lease. By following this advice, you can be assured that your interests are adequately protected.

Accepting verbal notification of liability coverage can be risky because there is no way to verify that the policy provides adequate coverage for all parties involved. For example, the lessee who is the policy holder might be covered adequately but their guests, clients, employees, or the landowner might not have adequate or any coverage under that insurance policy. As an added precaution, insurance agents and attorneys often advise their clients to make sure they are listed as "additional insured" on the lessee's liability insurance policy. Consult with your insurance agent, attorney and other business advisors ahead of time for assistance in choosing the best option for your fee hunting arrangement.

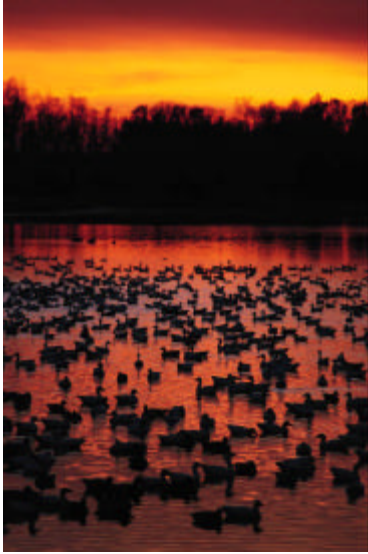
## LEASING ISSUES

A written contract that outlines the expectations of all parties involved in a hunting lease is highly recommended. While a number of generic leases can be accessed on the Internet, it is always a good idea to consult with an attorney before using any of these documents. Even though a web-based document may seem to contain all the points you wish to address, laws differ from state to state as do personal situations. An attorney can help insure that all of your legal bases are covered as they apply in your state.

The wording of a hunting lease will vary depending on the situation, but these items are usually included:

- A description of the property.
- A description of what activities are allowed.
- A description of what activities are not allowed.
- Allowances or restrictions for sub-leasing or outfitting.
- A list of who is allowed to hunt or access the property, or at least a limit on the number of hunters allowed in the field at any one time.
- When access is allowed. Access is usually allowed for the duration of the hunting season. But depending on the agricultural practices being used on the land or the needs/desires of the hunters, access may be more or less restrictive. Some landowners allow year-round access so hunters can plant and maintain food plots and scout. In other instances, such as with livestock production, more restrictive access might be preferred.
- Amount of payment and payment date(s).
- Termination clause.
- Proof of insurance.
- Site specific or client specific issues.





## MARKETING

Those interested in starting up a commercial hunting operation quickly see the need for marketing and advertising. But, landowners who are simply leasing their land should also consider the benefits of marketing.

While there are many instances where hunters actively search out land to lease, many others who are just as interested and willing to pay use a less aggressive approach. For hunters, websites, newspaper and magazine classified sections, and word of mouth are usually the search tools of choice. For a reasonable cost, or even free, you can usually spread the word about what you have to offer. Several websites allow landowners to post offerings for free and then charge hunters a small fee to access the listings. Websites of this type can easily be located through a web search.

If you pursue a commercial hunting operation, marketing will probably be more intensive, especially during the first couple of years. While marketing activities will be more involved, some of the most effective techniques can be employed at a low to moderate expense.

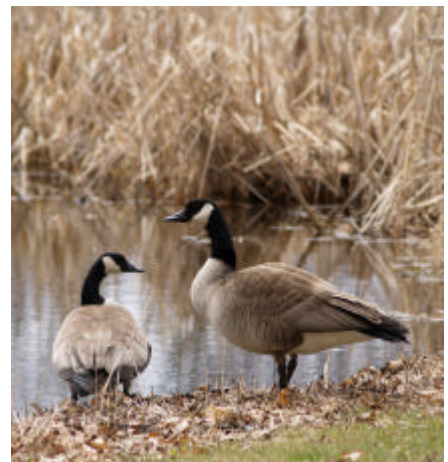
Donating hunts is one effective way to build the reputation of a new business. You can contact Ducks Unlimited, Pheasants Forever, Rocky Mountain Elk Foundation, Quail Unlimited and other organizations in your target market to donate a hunt that they can auction or use as a raffle item at a fund raising event. Since the majority of commercial hunting clubs and outfitters are patronized primarily by clients who do not reside in their immediate area, you'll want to target organizations that operate where your customers and potential customers live and work.

Depending on what your hunting club or outfitting business offers, the target market may be several states away. Hunts donated to local organizations generate good public relations in the community. But, these same donated hunts can have a bigger impact if you focus your efforts on distant markets, especially where deer and waterfowl hunting are concerned.

Networking is another marketing strategy. Inform your local Chamber of Commerce and/or tourism bureau of your enterprise. These organizations are in the business of promoting the local area and all it has to offer. Out-of-town hunters often contact the local Chamber or tourism bureau to find out about hunting opportunities. But, these organizations can only pass along information about your business if you provide it to them. In many cases, it would benefit a commercial hunting business to join the Chamber or business club in several local communities to generate awareness of the business and to network with other businesses that might steer potential clients in your direction. In addition, it is always advisable to make local convention and visitors bureaus (CVB), regional tourism development offices and the state bureau aware of your business operation and what you have to offer.

## CONCLUSIONS

Farmers and landowners have several options to generate profits from fee hunting. Approach these opportunities like any other business proposition. Consult insurance professionals, attorneys and other business advisors to minimize your risks. The trend of fee hunting will most likely continue for years to come. This trend is an opportunity for landowners and communities to capitalize on local tourism development and maximize the potential for success.





## RURAL ENTERPRISE SERIES

RES-07

### Hunting Lease Enterprise

Lease hunting is an arrangement whereby the landowner grants access to his or her land for hunting for a certain period of time in exchange for fees or services. Landowners can lease some or all rights to hunt on their property by the day, week, season, or year. By choosing who you want to hunt on the property, you can solve many trespass problems because those hunters will tend to keep others off the property. A hunting lease enterprise may be a good option for absentee landowners because it can require little maintenance work once the arrangement is set up.

The disadvantages of offering a hunting lease include the loss of privacy, changes in your farm operation to accommodate hunters, liability concerns, safety concerns, and possible resentment from those who formerly hunted the property for free. Selecting responsible hunters, securing proper insurance, having a written lease, and communicating regularly with the hunters can minimize most concerns.

The profitability of a hunting lease enterprise will depend on the accessibility of other hunting lands, proximity to a population center, how good the hunting is, what species are available, the facilities provided, and the type of lease arrangement. You may decide to operate a full-fledged hunting lodge, let hunters camp on your land, or offer just hunting. You can charge by the acre, the day, the season, or the year. Most leases are done on a yearly or seasonal basis. These decisions will heavily influence the profitability of the enterprise and the skills and time needed to make it successful.

In most of the Northeast, hunting is primarily for white-tailed deer, wild turkey, and possibly squirrels. In coastal and river areas of the mid-Atlantic states, there is a sizable market for waterfowl hunting. Quail, pheasant, and/or dove hunting are sometimes offered at shooting preserves to which animals are brought.

#### Skills and Time Needed

Skills and time needed for a successful hunting lease enterprise depend on the type of operation. Seasonal and yearly leases tend to be best for landowners who do not themselves hunt and for those who want to minimize the time they spend dealing with the enterprise. For daily charge operations, the landowner or hired manager must enjoy dealing with the public. This type of operation will require the greatest investment of time to ensure safety and generally provides a greater level of service to hunters. Food and guide services are often provided in daily charge arrangements. In return for the extra services required, the profit per hunter can be considerably higher.

If you decide to do land management to improve the quality of hunting, you'll need to educate yourself on wildlife habitat management and understand what fea-

tures will attract the target species. You'll need to carry out the practices you select or pay someone else to do it. Assistance on planning for wildlife is available from state wildlife agencies, cooperative extension, and nonprofit wildlife organizations.

#### Equipment Needed

For a simple seasonal or yearly lease in which the landowner provides no additional services, all that's needed to start the operation is a signed and notarized lease with a hunt club or group of individuals. If the hunt club is incorporated, then the club representative may be able to notarize the lease for the other members. More commonly, the landowner is leasing to a group of individuals who adopt a club name. In this case, all members must sign and notarize the lease for it to be fully binding. The landowner can specify in the lease any terms he or she wishes—

archery or muzzle loader only, the number of hunters allowed at one time, maintenance of hunting rights for certain friends and family members, etc. You can even specify in the lease that the leaser must perform certain jobs, such as planting or mowing food plots. Check with your state's wildlife management agency for applicable regulations and seasons. A sample lease is available on the Internet <[www.naturalresources.umd.edu/Pages/Hunting\\_Lease.html](http://www.naturalresources.umd.edu/Pages/Hunting_Lease.html)>. It may be helpful to have a qualified lawyer look over the lease before you offer it to hunters.

A daily lease operation may require a building in which hunters can gather to receive instructions from the landowner or manager. Food, lodging, and guide facilities may be offered for daily and/or weekly arrangements. Some landowners may have existing cabins on the land that they allow hunters to use. This can be an additional source of income. Many hunting liability policies provide a reasonable level of protection for fire damage, but check the policy you select for the conditions that apply. For more information on budgeting for lodging facilities, see our vacation cabin publication (RES-09). If your customers will be mostly out-of-towners and you don't plan to offer overnight accommodations, consider whether adequate overnight facilities and restaurants exist nearby to meet hunters' needs.

Waterfowl hunting will probably require the construction of blinds, and tree stands may be necessary for deer hunting. You can do habitat improvement such as timber cutting, planting, and mowing to increase the number or diversity of animals your land will support.

### **Liability and Licensing Concerns**

Each state has recreational statutes that minimize liability for landowners who allow individuals to hunt on their property at no charge. The statutes vary by state, but none of these statutes apply when you charge a fee. General farm insurance usually does not cover fee hunting or hunting leases in which a fee is charged. This is considered a business relationship, so special coverage is needed. Many landowners require hunters to sign a liability waiver as part of

a lease agreement, but this will not protect the landowner in the event of an accident. Special liability coverage is needed. Fortunately, a number of landowner associations and insurance companies offer reasonably priced insurance. A list of sources of liability insurance can be found on the Internet at <[www.naturalresources.umd.edu/Pages/Insurance.html](http://www.naturalresources.umd.edu/Pages/Insurance.html)>. You may wish to check with your present insurance provider as well.



Your state may require that you obtain a license for a fee hunting or hunting lease operation. Requirements will vary with the species. The costs are usually low, but penalties for not complying tend to be large. A special license may be needed to release and hunt pen-raised birds.

### **Marketing Concerns**

To avoid resentment from neighbors, relatives, friends, and others who may have been hunting on the property, you may wish to offer them the opportunity first to lease the land. Absentee landowners must be especially concerned with this because vandalism can occur while they are away. You could try marketing your hunting lease rights through local sporting associations. County Cooperative Extension or state wildlife management agencies should be able to provide some contact information for these groups. You might place ads in sporting magazines or the sports section of local newspapers.

The largest amount of time spent in managing a hunting lease operation is in selecting a hunt club or individuals who will respect your property and your objectives. It is best first to do phone interviews to ask specific questions that are important to you. Check the references that potential leasers provide. You can then meet a few likely candidates at the property and make your decision. Once selected, cultivate a good working relationship with the group that can last years and require minimal effort.

If you have an elaborate operation, you may want to develop an attractive brochure or make a video to display at hunting shows and to send to interested individuals. You'll need letterhead and envelopes and probably a logo to market your business.

Some hunting preserves promote their businesses as year-round family fun places. They stage frequent seasonal events for members' families, such as hayrides and barbecues. This fosters goodwill among the hunters and their families and can increase hunter loyalty to the preserve.

### **What to Charge?**

It can be difficult to find published information on the going price for hunting leases. Prices for a yearly lease for deer and turkey commonly range from \$3 to \$10 per acre. Waterfowl leases may bring in thousands of dollars if it is a prime location. What you charge will depend on how the lease is structured and if the land is actively managed, i.e., with food plots, tree stands, blinds, and many other factors. One way to find out is to talk with other landowners in the area who lease their land. Members of forest landowners associations and other agricultural associations will commonly share their experiences. Look in the paper and magazines and call other ads to see what others are asking.

### **Financial Picture**

The budget that follows is for a year-long lease on deer and turkey hunting rights on a 70-acre parcel at a rate of \$7 per acre. Except for minor costs for mar-

keting and telephone, the enterprise netted \$440. If the owner had invested in tree stands or wildlife planting, the income would have been less, but the fee per acre may have been higher. Many landowners work out agreements with hunters to plant food plots and maintain roads and fences. You may decide to allow hunters to provide their own tree stands, but you should specify in the lease that they not damage your better timber trees.

Hunting lease income on a yearly basis typically will pay the property taxes and then some. This is very attractive to many landowners. When you look at the amount of money generated over 20 years, you may find that the income from a hunting lease is worth more than periodic income from timber harvests.

Hunting lease operations are widely variable in charges, sources of revenue, and extent of services. The enterprise can be as plain or as fancy as you wish. Just remember that hunters are more likely to judge the experience by the quality of the hunting than by the quality of the lodge.

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### **Information Resources**

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Selected sources of liability insurance for hunt clubs and other recreational enterprises. Developed by Maryland Cooperative Extension in Spring 2000. [www.naturalresources.umd.edu/Pages/Insurance.html](http://www.naturalresources.umd.edu/Pages/Insurance.html).

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### **Authors**

Jonathan S. Kays, Regional Extension Specialist, Natural Resources

HUNTING LEASE ENTERPRISE BUDGET					
Property size	70				
Lease time frame	1 year				
Species	deer, turkey, squirrel				
Number of hunters	4				
Land use	50 acres forested, 20 in agriculture				
<b>INCOME</b>	<b>\$/acre</b>	<b>\$/year</b>			
Lease	7	490			
Cabin rental for season, year, etc	0	0			
Total		490			
<b>VARIABLE COSTS</b>		<b>UNIT</b>	<b>AMOUNT</b>	<b>PRICE</b>	<b>TOTAL COST (\$)</b>
Food plot (labor & seed)		acre	3	0	0
Marketing (newspaper-magazine ad)			1	30	30
Phone		1 month	1	20	20
Tree stand (labor/material)		stand	0	0	0
Lawyer review			0	100	0
Insurance (if not paid directly by club)					
Total variable costs					50
<b>Annual net income over variable costs</b>					<b>\$440</b>

# Fee Hunting

An Income Source for Mississippi's  
Non-Industrial, Private Landowners



By  
W. Daryl Jones  
Dr. Ian A. Munn  
Dr. Stephen C. Grado  
Dr. Jeanne C. Jones

Bulletin #FO164

FWRC  
RESEARCH  
BULLETIN



FWRC

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**Forest and Wildlife Research Center**

**Mississippi State University**

**February 2001**

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# Introduction

Mississippi's ecologically rich and diverse land base extends from the longleaf pine savannahs of the southern Coastal Flatwoods and Lower Coastal Plain to the pine-hardwood forests of the northern Interior Flatwoods and Upper Coastal Plain. The majority of forests, agricultural lands, wetlands, and watersheds are privately owned and support a diversity of game and non-game wildlife species (USDA/NRCS 1996). Traditionally, agricultural and timber production have been major sources of income for non-industrial, private (NIP) landowners in Mississippi. With the popularity of wildlife-related recreation, particularly hunting, Mississippi landowners can diversify their income through fee hunting activities if they have adequate habitat to support game species.

The promotion of fee-based wildlife recreation on private lands encourages voluntary conservation and restoration of ecologically sensitive lands, with limited state and federal governmental involvement. Incentive-based federal programs, such as the U.S. Department of Agriculture's Conservation Reserve and Wetland Reserve Programs, have protected numerous acres of marginal lands within the state. However, enrollment in these programs is limited by the available funding, which is subject to the uncertainty of the federal budgeting process. Section 404 of the 1972 Clean Water Act and the Endangered Species Act of 1987 provide

regulatory measures for the protection of wetlands (CEQ 1989); however, private landowners are seldom supportive of such regulations (Pease et al. 1997).

Wildlife recreation on private lands can benefit many Mississippi stakeholders. Private landowners can derive additional income from hunting, fishing, and non-consumptive activities such as bird watching and nature tours. Landowners who improve wildlife habitat quality, and thereby increase game concentrations, increase the recreational value of their land (Guynn 1990). Many forest and habitat management practices, including vegetation plantings and prescribed burning, benefit wildlife populations (Yarrow 1990; Johnson 1995). The net effects of landowner involvement in fee-based wildlife recreation are more conserved and restored acreage without the use of traditional regulatory measures; additional income sources for landowners; and enhanced opportunities for outdoor enthusiasts.

Little information is available concerning the number of non-industrial private landowners engaged in fee hunting, the amount and type of land dedicated to fee hunting by landowners, the various wildlife management practices these landowners implement, the costs and revenues associated with fee hunting, and various other issues related to fee hunting. This study was designed to provide this information for Mississippi.

## Methods

Non-industrial, private landowners owning a minimum of 40 acres in Mississippi were identified and randomly selected from the 1995 property tax records by the Survey Research Unit of the Social Science Research Center at Mississippi State University. Forty acres was selected as a minimum to eliminate urban and suburban properties included in the property tax records. A mail questionnaire was developed using a multi-disciplinary effort involving forestry, wildlife, social science, and environmental policy professionals. Four independent surveys were conducted consisting of a regional and a statewide survey for the 1996-1997 hunting season and a regional and statewide survey for the 1997-1998 hunting season. The 1996-1997 regional survey targeted the Mississippi counties of Issaquena, Sharkey, Warren, and Washington in the southern portion of the Mississippi River Alluvial Valley (Delta counties) and the 1997-1998 regional survey targeted the Mississippi counties of Jackson, Harrison, Hancock, Pearl River, Stone, and George along the state's gulf

coast (Gulf Coast counties). These regional survey areas were selected because they represent extremes in land use types. In the Delta, the percentage of the land base devoted to agriculture is among the highest in the state. Similarly, the percentage of the land base devoted to forestry in the Gulf Coast counties is among the state's highest (Hartsell and London 1995). The statewide surveys sampled the entire state and did not exclude respondents from the regional survey areas. Therefore, summaries of statewide surveys represent the entire state, not just the portions of the state outside the regional survey areas.

For the 1996-1997 hunting season, 1,363 questionnaires were mailed to a random sample of Mississippi landowners statewide and 1,293 questionnaires were mailed to a random sample of Delta county landowners at the end of March 1997. Landowners who did not return the questionnaire were sent a second questionnaire. Landowners were requested to confine their answers to the period March 1,

1996, to March 1, 1997, to reflect activities related to the 1996-97 Mississippi hunting season.

For the 1997-1998 hunting season, 2,030 questionnaires were mailed to a random sample of Mississippi landowners and 2,280 questionnaires were mailed to a random sample of Gulf Coast county landowners at the end of March 1998. The size of the original mailing was increased and the follow-up mailing eliminated to reduce survey time but still obtain approximately the same number of valid responses. Responses pertaining to the period March 1, 1997, to March 1, 1998, were requested to reflect activities related to the 1997-98 Mississippi hunting season.

The questionnaire was designed to obtain information on land ownership patterns, expenditures for wildlife management activities, and revenues and expenditures for fee hunting activities. Landowners were asked to report the acres owned by county and land-use type (e.g., forested, agriculture, wetlands, and other), whether they allowed hunting on their land, and whether they charged for hunting privileges.

Landowners who sold hunting privileges on their property were asked to report the payment method they used. Three payment methods were identified: hunting leases, permit hunting, and agreements with outfitters or guides. Hunting leases provide a group of hunters the sole right to

hunt specified portions of the landowner's property for a period of one or more years. Lease payments are specified in the lease agreement. Permit hunting allows individual hunters the right to hunt a specified portion of the landowner's property for a limited time - typically a day - in exchange for a permit or gun fee. Outfitter or guide arrangements provide outfitters with exclusive hunting privileges for a specified portion of the landowner's property. Outfitters then provide guided hunts on this land. Typically, the landowner receives an annual fee or a percentage of the outfitter's gross revenue.

For each payment method, landowners were asked to report the wildlife species included in the agreement and the acreage dedicated to fee hunting by land type. To estimate net returns, landowners were also asked to report hunting-related overhead expenses and wildlife management expenses. Overhead expenditures included manager or caretaker wages, liability insurance premiums, personal supervision, trespass prevention and property posting expenses, and guest accommodation costs. Wildlife management activities included vegetation management practices, establishment of food sources and cover, installation and maintenance of blinds and tree stands, and plantings and flooding for waterfowl. Property taxes were excluded from the study.

## Results

### Response Rates

For the 1996-1997 hunting season, 1,363 questionnaires were sent to a random sample of Mississippi landowners and 1,293 questionnaires were sent to a random sample of Delta county landowners. Landowners who did not return the questionnaire were sent a second questionnaire. Six hundred fifty three and 567 completed surveys were returned, respectively. After accounting for surveys returned because of incorrect addresses, property sales, or deceased landowners, the response rates were 48% and 49%, respectively.

For the 1997-1998 hunting season, 2,030 questionnaires were sent to a random sample of Mississippi landowners and 2,280 questionnaires were sent to a random sample of Gulf Coast county landowners. In order to reduce survey time but still obtain approximately the same number of valid responses, the size of the original mailing was increased and the follow-up mailing eliminated. For the statewide sample, 555 completed surveys were returned and for the Gulf Coast sample, 508 completed surveys were

returned. The response rates were 28% and 22%, respectively. No information was recorded for surveys returned due to incorrect addresses, property sales, or deceased landowners, so these rates are not adjusted for surveys sent to invalid addresses.

***The percentage of respondents that charged for hunting privileges was very small, ranging from 8% in the Gulf Coast counties to 14% in the Delta.***

### Types of Hunting

Most respondents allowed hunting of some type on their land. Over the two year survey period, the percentage of respondents allowing hunting ranged from 50% in the Delta during the 1996-1997 season to 77% statewide during the 1997-1998 season (Table 1). Most of these respondents allowed people to hunt without paying a fee. For example, 68% of respondents to the 1997-1998 statewide survey did not charge for hunting privileges. However, these free hunting privileges were extended almost exclusively to family and friends only. Less than 5% of respondents allowed the general public to hunt for free without first obtaining permission.

Up to an additional 12% of respondents allowed the general public to hunt for free but only if the hunters obtained permission first. The percentage of respondents that charged for hunting privileges was very small, ranging from 8% in the Gulf Coast counties to 14% in the Delta.

### Ownership Size and Composition

The land composition with respect to proportions of forest, agricultural, and other uses reported in these surveys reflects state and regional distributions. In the two statewide surveys, forests accounted for 56% and 60% of the average ownership (Table 2) which is consistent with the proportion of forest land on NIP ownerships in Mississippi as reported by Hartsell and London (1995). For the Delta counties, where agriculture predominates, forests accounted for only 32% of the average ownership. In contrast, for the Gulf Coast counties, where forestry predominates, forests accounted for 78% of the average ownership.

There were dramatic differences with respect to size of ownership between respondents that engaged in fee hunting and those who did not. For example, average ownership sizes for respondents engaged in fee hunting were 1,439 in the Delta counties and 1,590 in the Gulf Coast counties (Table 3), compared to 723 and 204 acres, respectively, for respondents not engaged in fee hunting (Table 4).

Furthermore, there were dramatic differences in land use composition with respect to proportions of forest, agricultural, and other uses between fee hunters and the general population. For all surveys, the proportion of forestland was substantially greater on ownerships of respondents engaged in fee hunting. For example, forests represented 90% of the average ownership of respondents engaged in fee hunting in the Gulf Coast 1997-1998 survey (Table 3), compared to only 78% for all Gulf Coast 1997-1998 respondents (Table 2). The difference was even greater in the statewide surveys.

### Payment Methods

Hunting leases were the most common payment method used for fee hunting, ranging from 7% of respondents in the Gulf Coast survey to 13% in the 1997-1998 state survey (Table 5). In contrast, 3% or fewer respondents sold individual hunting permits (Table 6) and even fewer respondents (< 1%) had agreements with guides or outfitters (Table 7).



Respondents who leased hunting rights owned, on average, between 1,066 and 1,628 acres depending on the survey region (Table 5). These respondents dedicated, on average, between 52% and 73% of their total ownership to hunting leases. Forests represented the overwhelming majority of leased lands. In the Delta counties, forests accounted for 70% of leased lands. In the Gulf Coast counties, forests accounted for 97% of leased lands. The percentage of forests in hunting leases for the statewide surveys fell between these extremes. Over 90% of respondents that leased included white-tailed deer (*Odocoileus virginianus*) in their leases (Table 8). The wild turkey (*Meleagris gallopavo*) was the second most commonly included species, ranging from 64% in the Delta to 79% in the Gulf Coast. Waterfowl were commonly included in Delta leases (52%) but not in other regions. Quail (*Colinus virginianus*), dove (*Zenaidura macroura*), and other game were also included by 22% to 45% of respondents, depending on the species and survey.

Respondents who sold individual hunting permits owned, on average, between 1,137 and 1,826 acres and dedicated between 33% and 68% of their ownership to permit hunting depending on the survey region (Table 6). As with hunting leases, forests accounted for the majority of lands dedicated to permit hunting. Deer were the most commonly featured species, ranging from 73% in the 1996-1997 state survey to 100% in the Gulf Coast survey (Table 9). Although dove hunting is a southern tradition (Hawkins 2000) that lends itself to permit hunting, the percentage of permit arrangements including dove was not substantially different than the percentage of hunting leases including dove.

Arrangements with guides and outfitters were not common in our study but were most frequent in the Delta. Delta landowners with arrangements with guides or outfitters dedicated 51% of their landholdings to the activity. Forested acreage accounted for 77% of the total lands committed to this arrangement (Table 7).

## Overhead Expenditures

Overhead expenditures are reported two ways: expenditures averaged across all respondents engaged in fee hunting (Tables 10 - 11) and expenditures averaged across those respondents engaged in fee hunting that incurred each expense (Tables 12 - 13). The first illustrates average expenditures for fee hunting landowners as a group. The second illustrates the average size of these expenditures for the landowners that incur them.

Overhead expenditures are substantially greater in the Delta and Gulf Coast counties compared to the statewide surveys. Mean overhead expenditures averaged \$1,981 in the Delta for the 1996-1997 season and \$863 in the Gulf Coast counties for the 1997-1998 season. In contrast, mean overhead expenditures in the statewide surveys were \$290 for 1996-1997 and \$199 for 1997-1998 (Table 10). In addition to this difference in overall magnitude, there was also a difference in the composition of overhead expenditures between the regional and statewide surveys. In the Delta and Gulf Coast counties, managerial expenses were the largest category followed by "other expenses," liability insurance, and road and trail construction. Guest accommodations and personal supervision also represented substantial expenditures in the Delta counties. In the statewide surveys, liability insurance and road and trail construction were the primary expenditures.

Overhead expenditures for the Delta and Gulf Coast counties were \$2.21 per acre and \$0.71 per acre respectively for land dedicated to fee hunting. For the statewide surveys, overhead expenditures averaged \$0.31 per acre in the 1996-1997 season and \$0.24 in the 1997-1998 season (Table 11). The relative magnitude of the various categories did not vary substantially from total overhead expenditures.

Although overall means provide interesting information about average overhead expenditures incurred by respondents engaged in fee hunting as a group, it provides very little information about typical expenditures for those who incur specific costs. Fewer than 35% of fee hunting respondents in

**Statewide,  
wildlife  
management  
expenditures  
averaged \$1.54  
per acre in the  
1996-1997 season  
and \$1.28 in the  
1997-1998 season.**

each survey incurred any type of overhead expenditure. The percentage was even lower for any specific overhead category. Mean overhead expenditures for respondents who reported such expenditures varied greatly between surveys from a high of \$7,469 for the Delta survey to \$1,084 for the 1996-1997 state survey (Table 12). Although mean overhead expenditures for the statewide 1997-1998 survey were higher than those for the Delta counties, this higher total resulted from one landowner with a full-time manager. Respondents in the Delta who incurred overhead expenditures generally paid substantially more than respondents in other surveys. Delta respondents with overhead expenditures averaged \$3.61 per acre in total overhead expenditures compared to expenditures of less than \$1.00 per acre for respondents in the Gulf Coast counties and state 1997-1998 surveys (Table 13).

## Wildlife Management Expenditures

For the 1996-1997 survey, respondents were asked to report their total wildlife management expenditures. Thus, the responses represent wildlife management expenditures for personal and/or fee hunting related purposes. Due to the survey design, it was not possible to isolate fee hunting and personal use related expenditures. Because most fee hunting landowners dedicated only part of their land to their fee hunting operations, some of their wildlife management expenditures may have been related to their personal hunting. Therefore, profits from fee hunting calculated using these expenditures are probably understated. For the 1997-1998 survey, only fee hunting respondents were asked to report their wildlife management expenditures and then only those related to their fee hunting operations. Thus, the responses represent wildlife management activities strictly for fee hunting on lands dedicated to fee hunting and can be used to provide a more accurate estimate of net revenues

About 23% of all respondents for the 1996-1997 season spent money on wildlife management (Table 14). Of those landowners actively managing for wildlife, Delta respondents spent, on average, \$3,504 per year compared to \$2,332 per year for respondents statewide. Vegetation management and planting food and cover crops were the most common activities. Twenty percent of respondents statewide and 18% of Delta respondents undertook these activities. Waterfowl management was more common in the Delta (9% of all respondents) than statewide (< 3%). Those respon-

dents who did manage for waterfowl spent considerable amounts, averaging over \$1,800 per year in the Delta and \$1,400 per year statewide.

About 19% of all fee-hunting respondents for the 1997-1998 season actively managed for wildlife as part of their fee hunting operation. Of those landowners engaged in fee hunting and actively managing for wildlife, Gulf Coast respondents spent, on average, \$2,798 per year for wildlife management and state-wide respondents spent, on average, \$2,556.

For all landowners engaged in fee hunting, wildlife management expenditures in 1996-1997, which included personal and fee hunting related expenditures, averaged \$1,477 and \$2,240 for the statewide and Delta surveys, respectively. Wildlife management expenditures in the 1997-1998 season, which included fee hunting related expenditures only, averaged \$401 and \$502 for the state-wide and Gulf Coast surveys, respectively (Table 15). For the statewide surveys, average wildlife management expenditures were \$1.54/acre in 1996-1997 and \$1.28/acre in 1997-1998 (Table 16). Per acre expenditures were greatest in the Delta counties (\$2.54/acre) and lowest in the Gulf Coast counties (\$0.42/acre). By comparing expenditures for the two seasons, it appears that, on average, landowners spend considerably more on wildlife management for personal hunting than for their fee hunting operation.

## Gross Revenues

Annual gross revenues from fee hunting were greatest in the Delta counties, averaging \$4,007 for hunting leases, \$8,339 for permit hunting, \$10,450 for arrangements with outfitters and guides, and \$5,254 overall (Table 17). Gross revenues from hunting leases were reasonably consistent across all survey groups; however, gross revenues from permit hunting and outfitter and guide arrangements were substantially greater in the Delta, thus resulting in higher overall gross revenues than other survey areas. Total gross revenues for the Gulf Coast and statewide surveys were at least \$1,000 less. On a per acre basis, gross revenues averaged \$5.86 in the Delta versus \$3.28 in the Gulf Coast, and \$3.08 and \$4.63 statewide for the 1996-1997 and 1997-1998 seasons, respectively (Table 18).

**Annual net revenues averaged \$3.91 per acre statewide during the 1997-1998 hunting season.**

## Net Revenues

Annual net revenues for the 1997-1998 season were substantially greater than the net revenues for the 1996-1997 season (Table 19). However, expenditures in the 1996-1997 season surveys included wildlife management expenditures related to personal hunting. Thus, net revenues from fee hunting for the 1996-1997 season are understated. Average net revenues for the 1997-1998 season more accurately represent typical net revenues available from fee hunting. Net revenues averaged \$3,244 per landowner for the statewide survey and \$2,655 for Gulf Coast counties. Although gross revenues were greater in the Gulf Coast counties, net revenues were lower due to higher overhead and wildlife management expenditures.

On a per acre basis, annual net revenues averaged \$3.91 statewide and \$2.17 in the Gulf Coast counties (Table 20). Net revenues for hunting leases ranged from \$4.59/acre statewide to \$2.29/acre in the Gulf Coast counties and, in general, were greater than net revenues per acre for permit hunting and outfitter/guide arrangements. The exception was guide/outfitter arrangements in the Delta where net revenues averaged \$4.91/acre.

Although net revenues for permit hunting appear to be low, many respondents engaged in permit hunting also had comparatively high overhead costs, particularly for guest accommodations and other permanent improvements. It appears likely that many of these landowners are in the process of developing a hunting based operation, and net revenues should increase once operations become fully established.

## Landowner Attitudes

Statewide and Gulf Coast respondents engaged in fee hunting during the 1997-1998 season were asked to rate problems associated with fee hunting listed in the survey on a scale from 1 (not a problem) to 5 (big problem). None of the problems received an average rating above 3, indicating that landowners engaged in fee hunting generally do not experience serious problems (Table 21). Poaching and trespassing was the highest rated problem, averaging 2.24 statewide and 2.18 for the Gulf Coast counties. Accident liability was rated next highest, with average ratings of 1.91 statewide and 2.03 for the Gulf Coast counties. Ratings for the remaining problems listed were lower, ranging from 1.25 to 1.82.

Respondents not engaged in fee hunting were asked to rate reasons why they elected not to participate in this

activity on a scale from 1 (not important) to 5 (very important). The average ratings for loss of land control, loss of privacy, accident liability, damage to property, and poaching and trespassing were all above 4 for both the statewide and Gulf Coast surveys. Overharvest of wildlife, financial gain not worthwhile, and not wanting wildlife hunted were rated

between 3 and 4. These ratings indicate substantial differences between the actual and perceived problems. Twenty-four percent of statewide respondents and 14% of Gulf Coast respondents indicated that they would be more likely to sell hunting rights to their lands if their concerns were reduced.

## Discussion

Forests provide substantial habitat for game and non-game wildlife species and are associated with the majority of our nation's remaining wetlands. However, these lands are under increasing pressures from agriculture, timber production, and development. Fee hunting provides monetary incentives to landowners for afforesting marginal agricultural land and protecting ecologically diverse forests and wetlands without the intervention of environmental regulations. Land-use planning by landowner cooperatives, economic development groups, and local communities can promote fee hunting on private lands as a viable alternative to development projects and agricultural production on marginal lands, thus protecting forests and emergent wetlands.

Respondents involved in fee hunting reported no appreciable problems associated with fee hunting on their land. In contrast, respondents not involved in fee hunting were very concerned about the potential problems, and this has deterred their participation. However, many non-fee-hunting respondents reported that if their concerns were reduced, they would be more inclined to sell hunting rights. Educational and outreach activities (e.g., Extension Service activities, Internet websites) are needed to inform landowners of the monetary returns associated with fee hunting, the wildlife management practices necessary to increase habitat quality, fee hunting marketing strategies designed to attract paying clients, and to reduce the perceived risks concerning

fee-hunting.

To diversify their income, landowners can combine activities that enhance fee-hunting opportunities with traditional land-use practices. For example, many forest management practices used to increase timber yields can also benefit wildlife populations (Rohweder et al. 2000). The supplemental income from hunting may encourage voluntary conservation and restoration of privately-owned lands. For example, because forestland is the dominant land use type in fee hunting arrangements, private landowners may elect to plant trees on marginal or abandoned agricultural land. Similarly, because ecologically sensitive lands, such as wetlands, typically provide excellent wildlife habitat, landowners engaged in fee hunting are likely to protect these lands, thereby reducing the need for governmental regulatory measures associated with environmental protection.

Future research should address why so few landowners sell hunting rights by examining landowner motivations, and the perceived and real barriers to fee hunting. Once these factors are better understood, outreach activities focusing on marketing strategies and wildlife habitat management practices can be directed toward private landowners to promote income diversification and ecological stewardship on private lands.

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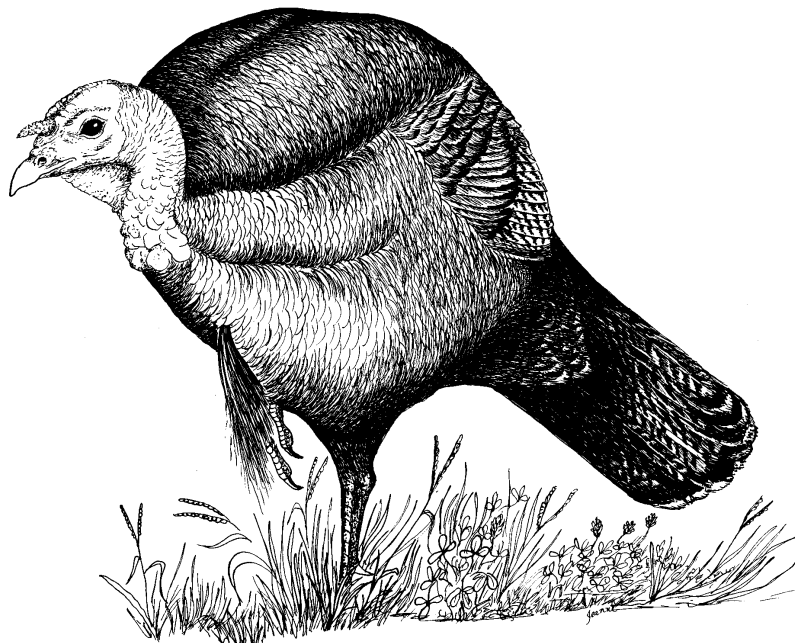


Table 1. Percentage of Mississippi respondents who allowed hunting on their land during the 1996-1997 and 1997-1998 hunting seasons.

Activity	State 1997 n = 653 %	Delta 1997 n = 567 %	State 1998 n = 555 %	Gulf Coast 1998 n = 508 %
Hunting Allowed	68	67	77	50
● Fee Hunting	11	14	14	8
● Hunting without a fee	64	60	68	44
✓ Family and friends	59	57	64	42
✓ General public by permission only	8	12	7	3
✓ General public without permission	4	1	3	2

Table 2. Average acreage owned in Mississippi by all survey respondents during the 1996-1997 and 1997-1998 hunting seasons.

Land Category	State 1997 n = 653	Delta 1997 n = 567	State 1998 n = 555	Gulf Coast 1998 n = 508
Forest	224	270	300	242
Agricultural	151	507	177	47
Other	23	54	22	23
Total	398	831	499	312
Wetlands <sup>a</sup>	23	158	28	25

<sup>a</sup> May occur in all land categories.

Table 3. Average acreage owned in Mississippi by respondents engaged in fee hunting during the 1996-1997 and 1997-1998 hunting seasons.

Land Category	State 1997 n = 71	Delta 1997 n = 79	State 1998 n = 69	Gulf Coast 1998 n = 39
Forest	925	775	941	1,445
Agricultural	205	539	285	52
Other	75	179	32	93
Total	1,206	1,439	1,258	1,590
Wetlands <sup>a</sup>	62	381	63	42

<sup>a</sup> May occur in all land categories.



Table 4. Average acreage owned in Mississippi by respondents not engaged in fee hunting during the 1996-1997 and 1997-1998 hunting seasons.

Land Category	State 1997 n = 582	Delta 1997 n = 488	State 1998 n = 486	Gulf Coast 1998 n = 469
Forest	138	188	208	141
Agricultural	144	502	161	46
Other	17	34	21	17
Total	299	723	391	204
Wetlands <sup>a</sup>	19	183	23	18

<sup>a</sup> May occur in all land categories.

Table 5. Average acreage leased for hunting by Mississippi respondents involved in hunting leases during the 1996-1997 and 1997-1998 hunting seasons.

Region	% of total respondents	Acres owned	Acres leased %	Acres leased		
				Forested	Agricultural	Other
State 1997 (n = 56)	10	1,066	64	537	72	70
Delta 1997 (n = 60)	12	1,397	52	519	101	112
State 1998 (n = 64)	13	1,155	62	591	93	29
Gulf Coast 1998 (n = 38)	7	1,628	73	1,155	4	36

Table 6. Average acreage dedicated to permit hunting by Mississippi respondents involved in permit hunting during the 1996-1997 and 1997-1998 hunting seasons.

Region	% of total respondents	Permits sold	Acres owned	Acres permitted %	Acres permitted		
					Forested	Agricultural	Other
State 1997 (n = 10)	2	9	1,826	33	528	47	34
Delta 1997 (n = 9)	3	50	1,767	68	898	263	47
State 1998 (n = 12)	3	17	1,137	49	353	191	17
Gulf Coast 1998 (n = 2)	1	26	1,646	47	768	10	--

Table 7. Average acreage dedicated to hunting guides or outfitters by Mississippi respondents involved with guides or outfitters during the 1996-1997 and 1997-1998 hunting seasons.

Region	% of total respondents	Acres owned	Dedicated acres %	Acres leased		
				Forested	Agricultural	Other
State 1997 (n=2)	< 1	515	23	42	74	0
Delta 1997 (n=4)	< 1	3,340	51	1,349	272	75
State 1998 (n=0)	0	0	0	0	0	0
Gulf Coast 1998 (n=0)	0	0	0	0	0	0

Table 8. Game species featured in hunting leases by percentage of respondents involved in leasing during the 1996-1997 and 1997-1998 hunting seasons.

Region	Deer %	Waterfowl %	Turkey %	Quail %	Dove %	Other Game %
State 1997 (n = 56)	94	25	70	28	31	22
Delta 1997 (n = 60)	92	52	64	20	36	32
State 1998 (n = 64)	97	27	78	38	45	27
Gulf Coast 1998 (n = 39)	92	26	79	32	29	29

Table 9. Game species included in hunting permits by percentage of respondents involved in permit hunting during the 1996-1997 and 1997-1998 hunting seasons.

Region	Deer %	Waterfowl %	Turkey %	Quail %	Dove %	Other Game %
State 1997 (n = 10)	73	33	33	40	47	13
Delta 1997 (n = 9)	87	69	38	8	31	8
State 1998 (n = 12)	94	28	78	33	50	17
Gulf Coast 1998 (n = 2)	100	33	67	33	33	0

Expenditure Category	State 1997 n = 60	Delta 1997 n = 68	State 1998 n = 69	Gulf Coast 1998 n = 39
Manager	\$29	\$645	\$14	\$244
Consultant	0	0	0	37
Attorney	0	35	19	0
Accountant	39	71	11	15
Surveyor/appraiser	0	0	0	6
Liability insurance	47	146	41	135
Personal supervision	25	120	8	43
Road/trail construction	44	410	52	131
Trespass prevention/posting	13	14	5	17
Guest accommodations <sup>a</sup>	0	126	21	4
Purchasing released game	--	--	9	0
Other expenses	93	414	19	231
Total expenditures	\$290	\$1,981	\$199	\$863

<sup>a</sup>Construction costs were amortized over 27.5-year period.

Expenditure Category	State 1997 n = 60	Delta 1997 n = 68	State 1998 n = 69	Gulf Coast 1998 n = 39
Manager	\$0.03	\$0.72	\$0.02	\$0.20
Consultant	0.00	0.00	0.00	0.03
Attorney	0.00	0.04	0.02	0.00
Accountant	0.04	0.08	0.01	0.01
Surveyor/appraiser	0.00	0.02	0.00	0.01
Liability insurance	0.05	0.16	0.05	0.11
Personal supervision	0.03	0.13	0.01	0.03
Road/trail construction	0.05	0.46	0.06	0.11
Trespass prevention/posting	0.01	0.02	0.01	0.01
Guest accommodations <sup>a</sup>	0.00	0.14	0.03	0.01
Purchasing released game	NA	NA	0.01	0.00
Other expenses	0.10	0.46	0.02	0.19
Total expenditures	\$0.31	\$2.21	\$0.24	\$0.71

<sup>a</sup>Construction costs were amortized over 27.5-year period.

Table 12. Mean overhead expenditures by Mississippi respondents reporting expenditures during the 1996-1997 and 1997-1998 hunting seasons.				
Expenditure Category	State 1997 (n)	Delta 1997 (n)	State 1998 (n)	Gulf Coast 1998 (n)
Manager	\$583 (3)	\$8,778 (5)	\$32,225 (2)	\$1,900 (5)
Consultant	0 (0)	0 (0)	1,500 (1)	108 (4)
Attorney	0 (0)	392 (6)	331 (4)	0 (0)
Accountant	588 (4)	808 (6)	242 (3)	192 (3)
Surveyor/appraiser	0 (0)	0 (0)	0 (0)	250 (1)
Liability insurance	311 (9)	740 (13)	1,583 (6)	1,054 (5)
Personal supervision	750 (2)	2,038 (4)	290 (2)	415 (4)
Road/trail construction	441 (6)	2,532 (11)	900 (4)	850 (6)
Trespass prevention/posting	150 (5)	190 (5)	117 (3)	217 (3)
Guest accommodations <sup>a</sup>	0 (0)	1,714 (5)	968 (3)	80 (2)
Purchasing released game	NA	NA	1,700 (2)	0 (0)
Other expenses	505 (11)	2,820 (10)	1,433 (3)	1,499 (6)
<b>Total expenditures</b>	<b>\$1,084 (16)</b>	<b>\$7,469 (18)</b>	<b>\$8,421 (11)</b>	<b>\$2,399 (14)</b>

<sup>a</sup>Construction costs were amortized over 27.5-year period.

Table 13. Mean overhead expenditures per acre by Mississippi respondents reporting expenditures during the 1996-1997 and 1997-1998 hunting seasons.				
Expenditure Category	State 1997 (n)	Delta 1997 (n)	State 1998 (n)	Gulf Coast 1998 (n)
Manager	\$0.06 (3)	\$3.40 (5)	\$20.52 (2)	\$0.33 (5)
Consultant	0.00 (0)	0.00 (0)	1.32 (1)	0.28 (4)
Attorney	0.00 (0)	0.08 (6)	0.29 (4)	0.00 (0)
Accountant	0.16 (4)	0.19 (6)	0.20 (3)	0.04 (3)
Surveyor/appraiser	0.00 (0)	0.00 (0)	0.00 (0)	0.28 (1)
Liability insurance	0.13 (9)	0.30 (13)	1.09 (6)	0.34 (5)
Personal supervision	0.12 (2)	1.34 (4)	0.29 (2)	0.84 (4)
Road/trail construction	0.39 (6)	0.81 (11)	0.60 (4)	0.24 (6)
Trespass prevention/posting	0.12 (5)	0.09 (5)	0.07 (3)	0.04 (3)
Guest accommodations <sup>a</sup>	0.00 (0)	0.76 (5)	1.26 (3)	0.61 (2)
Purchasing released game	NA	NA	1.70 (2)	0.00 (0)
Other expenses	0.86 (11)	1.08 (10)	1.20 (3)	2.41 (6)
<b>Total expenditures</b>	<b>\$0.66 (16)</b>	<b>\$3.61 (18)</b>	<b>\$5.49 (11)</b>	<b>\$0.92 (14)</b>

<sup>a</sup>Construction costs were amortized over 27.5-year period.

Table 14. Mean wildlife management expenditures of Mississippi respondents engaged in wildlife management during the 1996-1997 and 1997-1998 hunting seasons.

Management Practice	State 1997 <sup>a</sup> (n)	Delta 1997 <sup>a</sup> (n)	State 1998 <sup>b</sup> (n)	Gulf Coast 1998 <sup>b</sup> (n)
Vegetation Management	\$1,125 (135)	\$1,020 (103)	\$1,244 (13)	\$346 (5)
Food and Cover	1,021 (134)	1,938 (110)	866 (11)	2,276 (6)
Stands and Blinds	542 (76)	738 (82)	1,258 (6)	840 (5)
Waterfowl Management	1,485 (15)	1,813 (52)	0 (0)	0 (0)
Total Expenditures	\$2,332 (151)	\$3,504 (135)	\$2,556 (13)	\$2,798 (7)

<sup>a</sup> Includes wildlife management expenditures for fee hunting lands and lands for the personal use of landowners.

<sup>b</sup> Includes wildlife management expenditures for fee hunting lands only.

Table 15. Mean wildlife management expenditures of Mississippi respondents engaged in fee hunting during the 1996-1997 and 1997-1998 hunting seasons.

Management Practice	State 1997 <sup>a</sup> n = 60	Delta 1997 <sup>a</sup> n = 68	State 1998 <sup>b</sup> n = 69	Gulf Coast 1998 <sup>b</sup> n = 39
Vegetation Management	\$745	\$398	\$164	\$44
Food and Cover	531	1,320	133	350
Stands and Blinds	121	309	104	108
Waterfowl Management	80	213	0	0
Total Expenditures	\$1,477	\$2,240	\$401	\$502

<sup>a</sup> Includes wildlife management expenditures for fee hunting lands and lands for the personal use of landowners.

<sup>b</sup> Includes wildlife management expenditures for fee hunting lands only.

Table 16. Mean wildlife management expenditures per acre of Mississippi respondents engaged in fee hunting during the 1996-1997 and 1997-1998 hunting seasons.

Management Practice	State 1997 <sup>a</sup> n = 60	Delta 1997 <sup>a</sup> n = 68	State 1998 <sup>b</sup> n = 69	Gulf Coast 1998 <sup>b</sup> n = 39
Vegetation Management	\$0.78	\$0.45	\$0.59	\$0.04
Food and Cover	0.55	1.50	0.40	0.29
Stands and Blinds	0.13	0.35	0.29	0.09
Waterfowl Management	0.08	0.24	0.00	0.00
Total Expenditures	\$1.54	\$2.54	\$1.28	\$0.42

<sup>a</sup> Includes wildlife management expenditures for fee hunting lands and lands for the personal use of landowners.

<sup>b</sup> Includes wildlife management expenditures for fee hunting lands only.

Payment Method	State 1997 (n)	Delta 1997 (n)	State 1998 (n)	Gulf Coast 1998 (n)
Leases	\$2,645 (56)	\$4,007 (60)	\$3,646 (64)	\$3,908 (38)
Permits	2,954 (10)	8,339 (9)	2,655 (12)	4,100 (2)
Outfitters/Guides	175 (1)	10,450 (4)	0 (0)	0 (0)
Total mean revenues	\$2,964 (60)	\$5,254 (68)	\$3,844 (69)	\$4,018 (39)

Payment Method	State 1997 (n)	Delta 1997 (n)	State 1998 (n)	Gulf Coast 1998 (n)
Leases	\$3.59 (56)	\$5.66 (60)	\$4.91 (64)	\$3.27 (38)
Permits	5.89 (10)	6.50 (9)	3.87 (12)	3.70 (2)
Outfitters/Guides	1.35 (1)	6.16 (4)	0.00 (0)	0.00 (0)
Total gross revenues	\$3.08 (60)	\$5.86 (68)	\$4.63 (69)	\$3.28 (39)

	State 1997 n = 60	Delta 1997 n = 68	State 1998 n = 69	Gulf Coast 1998 n = 39
Cash flows from hunting				
Gross Revenues	\$2,964	\$5,254	\$3,844	\$4,018
Overhead expenditures	290	1,981	199	863
Wildlife management expenditures	1,135	1,419	401	502
Net revenues <sup>a</sup>	\$1,539	\$1,845	\$3,244	\$2,655

<sup>a</sup> Net revenues for 1997 surveys are understated because the corresponding wildlife management expenditures include expenditures on lands for the personal use of landowners.

Payment Method	State 1997 (n)	Delta 1997 (n)	State 1998 (n)	Gulf Coast 1998 (n)
Leases	\$2.85 (56)	\$3.10 (60)	\$4.59 (64)	\$2.29 (38)
Permits	2.44 (10)	0.96 (9)	1.91 (12)	1.80 (2)
Outfitters/Guides	0.00 (1)	4.91 (4)	0.00 (0)	0.00 (0)
Net Revenues <sup>a</sup>	\$1.60 (60)	\$1.95 (68)	\$3.91 (69)	\$2.17 (39)

<sup>a</sup> Net revenues for 1997 surveys are understated because the corresponding wildlife management expenditures include expenditures on lands for the personal use of landowners.

Table 21. Mean ratings of problems associated with fee hunting reported by Mississippi respondents engaged in fee hunting during the 1997-1998 hunting season. Problems were rated on a scale from 1 (not a problem) to 5 (big problem).

Type of Problem	State 1998	Mean Rating	Gulf Coast 1998
Loss of land control	1.56		1.25
Loss of privacy	1.82		1.39
Accident liability	1.91		2.03
Damage to property	1.77		1.67
Overharvest of wildlife	1.37		1.54
Poaching and trespassing	2.24		2.18
Financial gain not worthwhile	1.71		1.79
Breach of contract by hunters	1.27		1.34
Other	1.59		1.25

Table 22. Mean ratings of problems that deterred respondents from engaging in fee hunting rated by Mississippi respondents not engaged in fee hunting during the 1997-1998 hunting season. Problems were rated on a scale from 1 (not important) to 5 (very important).

Type of Problem	State 1998	Mean Rating	Gulf Coast 1998
Loss of land control	4.19		4.27
Loss of privacy	4.26		4.41
Accident liability	4.34		4.49
Damage to property	4.29		4.30
Overharvest of wildlife	3.60		3.73
Poaching and trespassing	4.19		4.23
Financial gain not worthwhile	3.75		3.88
Inability to obtain bank credit for fee hunting operations	1.80		1.74
Not knowledgeable in fee hunting arrangements	2.10		2.04
Land tract too small	2.59		2.87
No demand for fee hunting	2.37		2.10
Do not want wildlife hunted	3.15		3.59
Other	4.23		4.47

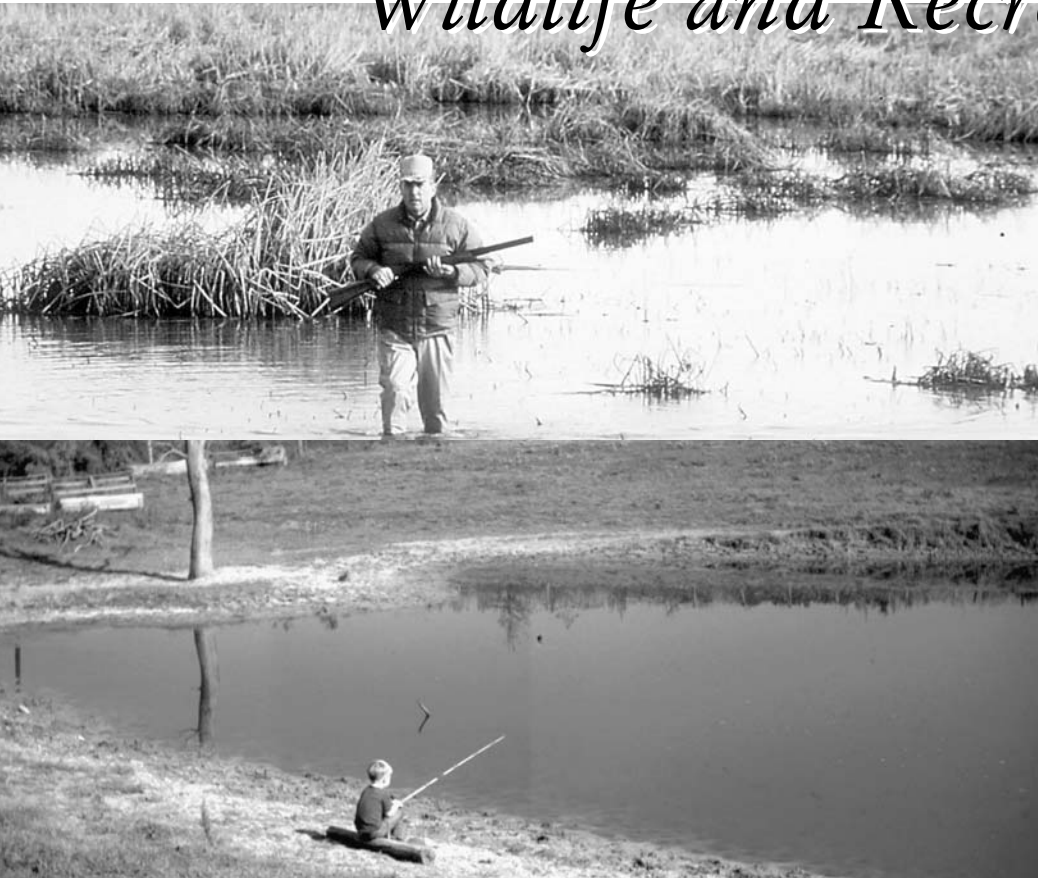


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# NATURAL RESOURCE ENTERPRISES

## *Wildlife and Recreation*



## Hunting Leases: Considerations and Alternatives for Landowners

Interest is growing in the South and throughout the United States for landowners to provide recreational access to their land for sportsmen and others to hunt, fish, and enjoy other types of outdoor recreation. For many farm, ranch, forest, and other landowners, alternative enterprises may provide an opportunity to sustain their natural resource base, maintain their quality of life, and increase annual profits.

Offering access to private land for recreational uses by the public can be a viable alternative enterprise. Natural resource-based alternative enterprises on private land range from producing products such as pine straw for

mulching, to providing access for bird watching, trail riding, and hunting and fishing.

Recreational hunting and fishing leases have become an important source of supplemental income for many landowners in recent years, and the demand for access to private lands for recreational uses continues to grow. When these enterprises are appropriately developed and implemented, they will contribute to local community economies in many ways.

However, there are many things to consider before implementing a hunting lease.

Not all private landowners will want to open their lands for such access and use, but for those who feel they would like to explore such

enterprises, some tradeoffs will be necessary. Landowners must consider and manage such enterprises as an integral part of their total operations. They must also keep in mind the long-term sustainability of their natural resource base on which the total operation depends.

The information in this publication helps you as a landowner make informed decisions about one potential alternative natural resource-based enterprise – hunting leases. Much of the information in this publication comes from a number of sources, including scientific papers presented at various conferences, and from personal experience working with private landowners and recreational users over the past 35 years.

This publication does not provide all-inclusive, definitive information on hunting leases for any individual. Natural resource produc-

tivity and sustainability capabilities in different areas are not necessarily the same. Each geographic site capability is different. Each landowner's objectives and management skills are different. Figures in this publication for fees charged per acre and minimum amounts of acreage suggested for specific kinds of hunting operations may not be appropriate for every operation. Some of the figures provided are "rule of thumb" or "ballpark" estimates for consideration based on regional or statewide surveys and informal discussions with enterprise operators. Liability insurance sources provided are simply sources known, and it is very likely there are many other providers. Sample lease agreements and sample hunting club bylaws are simply templates that you, a manager, or a hunting club group may find useful to customize for individual and operation needs.

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## TYPES OF HUNTING LEASES

A hunting lease is an agreement between you as the landowner (lessor) and hunters (lessees) that grants the hunter access rights for hunting game animals (and other specified activities) on your property for a specified time period. Hunters usually pay you an agreed-upon dollar amount per acre or per hunter. However, in some leases you may agree to a smaller combination of dollars per acre or per hunter with a written agreement that the hunter or hunters perform some service in exchange for the privilege of hunting access. There are numerous kinds of leases and agreements based on the agreed-upon collaboration (usually in writing) between the lessor and lessee. Following are some common types of hunting leases:

### ■ *Long-Term*

- ✓ Seasonal lease – all species of game legal to hunt
- ✓ Seasonal lease – specified animal or animals
- ✓ Annual or multi-year lease – all species
- ✓ Annual or multi-year lease – specified game animal or animals.

### ■ *Short-Term*

- ✓ Daily hunting, often by permits
- ✓ Weekly hunts
- ✓ Multi-day (three to five) day hunts
- ✓ Special Season Hunts – such as bow, muzzle-loader, or rifle only.

The most common types of hunting leases are the long-term annual and long-term seasonal. Under this type of leasing system, you generally provide individual hunters or groups of hunters the privilege of access to your land for hunting for a season, a full year, or for several consecutive years.

This type of leasing usually allows the hunter or hunters the privilege of hunting legal game species during specified open seasons, with fees assessed on a cost per-acre or lump sum basis. These leases let you specify which game species can be hunted, and you can reserve hunting rights for yourself, your guests, and immediate family. In fact, depending on the interests of the lessee and your willingness, these leases can be customized to the satisfaction of both you and the lessee, as well as the agreed-upon price paid for the privilege of leasing.

For many landowners, such long-term seasonal or annual leases for a set price per acre or lump sum seem to be the easiest to negotiate and require the least oversight. If you are satisfied with this type of arrangement, the lease fee is satisfactory, and the lessee(s) has demonstrated appropriate and responsible care of the land and resources, you can continue such annual leases on a multi-year arrangement.

Long-term leases have advantages and disadvantages. The advantages are that such leases generally result in better landowner-sportsmen relationships, because you get to know the lessee(s) personally, helping to build trust over time, and the sportsmen get to understand what your objectives are, and they become interested in helping manage the properties to meet these objectives. The longer time that lessee(s) lease a property, the better they come to know it, and the more likely they will become interested in working with you to improve habitat management for wildlife. The more provincial interest they develop in the property, the more they will help to prevent trespass and poaching. If you are satisfied with the long-term arrangement, you can project anticipated income.

The disadvantage is that sometimes such long-term lease arrangements make it difficult to increase lease fees when you need to, and some lessee(s) take such an interest that they begin to think of the property as theirs and forget to honor your rights. However, both sportsmen and landowners are more often willing to make time, labor, and financial investments in leased property when they know they have a secure arrangement for more than one year or season. Such long-term lease arrangements can be for specific game species only or offer hunting for all legal game species to the lessee(s). It can include such other activities as scouting before hunting seasons, camping, and fishing if available.

If you are active in the day-to-day management of the property, you may also choose to lease access rights for hunting one particular species to one hunter or group of hunters and to yet another hunter or group of hunters for hunting another species. An example would be deer hunting to one group and spring turkey hunting to another, or dove hunting to one group and waterfowl hunting to another. Obviously this works best when seasons do not overlap, and it generally requires intensive involvement by you or someone you assign such management responsibilities to. These leases usually return the most annual income but clearly also require the most intensive involvement of you or a

manager. They also require more labor, time, and habitat management investments, such as providing dove fields, food plots, waterfowl blinds, and other requirements.

Short-term leases can be on a daily permit basis, such as for dove hunting; a per weekend basis for deer or waterfowl hunting; a weekly basis during a special season, such as bow hunting or muzzle-loader hunting; or for a one-season, special management type of hunt, such as a late-season doe hunt only. Some of these hunts can be packaged to include guides, lodging if available (on the lease property or at a local motel), and meals. Clearly this type of leasing arrangement requires intensive management and marketing for greatest success, but it can yield a higher rate of return and does not obligate the entire property for an entire hunting season or year. In other words, you can provide access to limited portions of the land for shorter periods of time and can limit the hunting to the species desired.

Hunting leases can be developed by sportsmen contacting you directly about the potential of leasing your land for hunting rights access. Or a broker may make such arrangements. However, more and more landowners interested in leasing their land for hunting access are finding that newspaper and magazine ads or a web site will often locate willing hunters or groups of hunters interested in leasing tracts of land for hunting privileges. There can be some advantage for some owners, particularly non-resident landowners, in having a broker take care of the advertising and locating and dealing with responsible lessee(s) and with neighboring landowners. Another advantage is the broker can help ensure the lessee(s) honor their lease and pay on time. However, such brokers will come at a cost.

Before beginning a hunting lease program, you need to consider a number of things and be prepared to spend some time, labor, and resources to determine the value of your resources, how to manage and sustain them as renewable natural resources, what your long-term objectives are, and if such a leasing program is compatible with your other land management objectives. You also should recognize the advantages and disadvantages of leasing your land for hunting, such as these:

#### ■ *Advantages*

- ✓ Can be a dependable source of additional annual income

- ✓ Can provide in-kind labor assistance from lessee(s)
- ✓ Can help reduce trespass problems
- ✓ Can help you gain better control of who is using the land for what purposes
- ✓ Can complement other land management operations
- ✓ Can improve other recreational opportunities
- ✓ Can benefit local community economy
- ✓ Can help you better manage wildlife habitat and populations

### ■ *Disadvantages*

- ✓ Increased liability concerns and costs
- ✓ Will require increased landowner or manager involvement of dealing with lessee(s)
- ✓ Could mean some tradeoffs in other operations
- ✓ Could present conflicts with neighbors
- ✓ Likely to require some investment in habitat and access management
- ✓ Will require record keeping, evaluation, and business management

## HUNTING LEASE AGREEMENTS

Without question, most hunting leases should be undertaken only with a written agreement. Such an agreement serves as a contract that protects the agreed-upon rights of both you (lessor) and the sportsman (lessee). The significance of a well-considered written lease agreement cannot be over emphasized, since it is the foundation for a successful hunting lease program. Effective hunting lease agreements protect your interests yet allow enough flexibility to permit enjoyment of the access rights provided to the sportsmen or lessee(s). Such leases can be developed from “boiler-plate” examples but can be customized to protect you against later conflicts. A lease must be well thought out before being finalized and agreed to by you and lessee(s). Most of the potential conflicts between you and lessee(s) can be prevented, and a good working relationship can be maintained by having a mutually agreed-upon written lease. Some “boiler-plate” examples of written hunting leases are provided in the back of this publication for examination and modification

to meet individual needs. Your needs and desires are paramount but must be tempered by recognizing the needs and desires of the lessees and what they are willing to pay for.

### ■ *Considerations when Developing A Lease Agreement*

- ✓ **References** – If you are not familiar with sportsmen or groups who desire to lease your property, you should not hesitate to ask for references. You may get references from other landowners who leased to the lessee(s) previously or from Conservation officers or community leaders who know the person(s).
- ✓ **Proof of liability insurance** – As part of the lease agreement you can require the lessee(s) to pay for liability insurance (with your name listed on the policy) and provide proof of coverage by keeping a copy of the insurance policy with proof of purchase. Requirements for liability insurance can be written into the lease agreement. Be sure such policies cannot be canceled during the lease time. This precaution transfers a large portion of the liability to the lessee(s). Otherwise you are responsible for the costs of appropriate liability insurance coverage to ensure your protection.
- ✓ **Establish and maintain open communication** – An open channel of communication from the beginning prevents potential misunderstanding between you and sportsmen. For hunting clubs or organized groups of lessees, try to arrange a time before the hunting season to meet with the group and get to know them.
- ✓ **Organized groups/hunting clubs** – Hunting clubs should be well organized and governed by self-regulating bylaws and have a contact person designated. A sample of hunting club bylaws is provided in the back of this publication. You should receive a copy of adopted bylaws.
- ✓ **Lease to local sportsmen when possible** – Local sportsmen, if willing to pay, can often help look after property. Having such local participation often avoids the local resentment of the “outsider” image.
- ✓ **Annual meetings** – You should meet with sportsmen groups or hunting clubs who lease your land at least once each year before the hunting season to discuss land use changes,

modifications that may be needed to the lease agreement, or your need for some help improving habitat or hunting opportunities.

- ✓ **Limit hunters and guests** – For the benefits of safety, enjoyment, and protection of the resource, the number of hunters must be restricted. For example, too many hunters using the property at any one time during the season may compromise the safety, enjoyment, and sustainability of the resources. Here are some rules of thumb for consideration with exceptions for different kinds of habitat and hunting: for deer hunting, one hunter per 100 acres; for waterfowl hunting, one hunting party per 100 acres of wetlands or waterfowl habitat; and for turkey, one hunter per 200 acres.
- ✓ **Written rules** – Consider drafting written rules aimed at preventing potential accidents and protecting property, especially if there are known hazards, such as old wells, sinkholes, and other risks to personal safety on the property. Make sure all lessees are aware of these written rules, and have them sign a statement that they have read and understand these rules.
- ✓ **Incorporation** – Hunting clubs representatives (officers) cannot legally represent the entire club when signing a lease agreement unless the club or group is incorporated. If the club or group is not incorporated, each member of the club/group must sign and date the written lease agreement.
- ✓ **Liability risk reduction** – In addition to requiring the club/group to purchase an insurance policy to cover liability, you should practice a risk reduction program that reduces all known hazards on the property. Keep records of such efforts to reduce or eliminate known and potential risks to lessees. You should keep accurate records in case of a libel suit. Identify hazards you cannot reduce or eliminate, and explain them to lessees with a map and written description.

Here are other considerations: If ATVs are to be used on property, require additional rider insurance from lessees. Avoid single-strand cable gates, or have them clearly marked and flagged. If portable tree stands are to be used, make sure lessees' liability insurance covers such use, or require permanent stands to be used. In accord with state law, require sportsmen to pass an approved hunter safety program and

show a certificate of completion. (Anyone born after January 1, 1972 is legally required to complete a hunter education course before purchasing a Mississippi hunting license. Also, anyone 12 years of age but under 16 years of age must have a certificate showing completion of a hunter education course approved by the Department of Wildlife, Fisheries, and Parks before hunting in Mississippi.)

- ✓ **Attorney lease review** – Have an attorney review the written lease before it is agreed to and signed by either party. This helps protect both parties and clarifies that the agreement is legal and binding.
- ✓ **Up-front payment** – The agreed-upon lease payment should be made before the hunting season begins, preferably before the date of the lease period. This ensures that payment is made before the hunt begins, and it allows the owner the potential of investing the funds and earning interest.
- ✓ **Permanent structure policy** – You may or may not want the lessee to put up permanent structures, such as buildings, sheds, or cabins. If you do permit any of these, you should decide what types of structures to allow and what should happen to these structures if and when the lease is terminated.
- ✓ **Vehicle restriction** – You may want to restrict what type of vehicles may be used on identified roads and trails and/or restrict the use of particular types of vehicles to certain roads on the property.
- ✓ **Notification of presence** – You may require hunters to check in and out via a check station or notify you in advance by phone or in writing when hunting or otherwise accessing the property.
- ✓ **Arbitration** – Disputes can arise, regardless of how well the lease agreement is written. Some leases specify using arbiters who were agreed upon in advance by both parties. The arbiter should be a neutral party, such as an attorney, conservation officer, or other mutually agreed-upon individual.
- ✓ **Game law violations** – In case game laws are violated, unintentionally or intentionally, the club/group bylaws need to ensure the violation is reported to both the local conservation officer and to the landowner.

- ✓ **Automatic lease renewal** – If you are pleased with the lessee(s), you may want to provide for an automatic lease renewal agreement consideration. This can be put into effect barring conflicts or need for some change in the agreement, if agreed upon 90 days before the lease terminates. This may be an advantage for both parties if things are going well.

### ■ *Suggested Items To Include In a Written Hunting Lease*

- ✓ Your name, address, and phone number and the same information for the sportsmen, group, or club (lessees).
- ✓ The purpose of the hunting lease, describing the species of game allowed to be hunted as well as other activities allowed on the property, such as camping, fishing, scouting, permanent structure placement, and disposal.
- ✓ A description of the property with the location of the tract, boundaries, and areas off limits to hunting access. You should also provide a map with the property description. It is wise to conduct a tour of the property or tract to be leased with lessees to point out clearly marked property boundaries as well as any known restricted-use areas or hazards. In the description it is helpful to point out the present condition of the property, such as 20-year-old pine plantation, row crop areas, pasture, restricted areas, and reasons for restrictions.
- ✓ The duration of the lease, describing the beginning and ending dates of the lease, whether seasonal or annual, or longer term.
- ✓ The method of lease payment, stating how much the lessee(s) must pay and a date when payment must be received. Penalties for late payment can be described but must be well in advance of the beginning of the hunting season.
- ✓ Damage provisions and a deposit (if you think this is needed) to cover the costs of damage or loss of your property, livestock, or other resources if not repaired or compensated. Such damage provisions should specify that the lessee(s) are responsible for any damages or losses they or their guests (if allowed) cause to the property or to your assets. You should return damage deposits to the lessee(s) if damage is cor-

rected or does not occur during the effective lease period.

- ✓ A termination of a lease clause with provisions to cancel a lease agreement if either party fails to abide by the terms of the written lease agreement, such as a lessee's violating state or federal game regulations. It must also ensure your or your heirs' rights to cancel a lease if you sell the property or if you die within the effective lease period.
- ✓ A subleasing clause that specifies whether the lessee(s) can sublease or assign leasing rights to a third party. You should avoid the idea of subleasing your property to third party access by the original lessee(s).
- ✓ The lessee's responsibilities should be clearly defined within the agreement to include these items: closing gates and repairing broken fences; obeying all state and federal game regulations; helping put out wildfires; evicting trespassers or at least immediately contacting the owner or local law enforcement personnel; adhering to the management plan regarding game harvest recommendations; keeping good game harvest records; appropriate posting of the property; restrictions on the use of alcohol; and off road vehicles as you determine.
- ✓ Your (lessor) responsibilities should be clearly defined within the lease to include duties (as you agree to provide) such as maintaining roads, planting food plots or preparing fields for dove hunting, and providing facilities for lodging or for cleaning and storing harvested game. Obviously these duties and amenities have a cost, and you will have to consider them in the cost of the lease.
- ✓ Your rights as the landowner must be clearly stated in the lease, such as the right to continue to manage the land to meet your identified objectives, the right to allow family members defined hunting privileges, and the right to request removal of a club or group member who violates property or approved behavior codes.
- ✓ You can add indemnity clauses or "hold harmless" disclaimers to the lease agreement. These may protect you from liability if someone is injured on your land. You can use them as proof that an injured lessee assumed the risks of doing a particular activity like climbing a tree or

crossing a fence. They do not, however, relieve you of liability associated with demonstrated negligence.

- ✓ The number of members allowed in lessee club/group.
- ✓ The number of guests, if allowed, and the number of total lessee(s) and invited guests that may be on the property to hunt at any specific time.

### ■ *Determining Hunting Lease Price Structure*

If you have no experience leasing land for hunting access, one of the most difficult decisions is determining a fair market price that is competitive yet gives you a reasonable return for the lease and any services or amenities provided. The following are known methods but are by no means the only methods:

- ✓ **Break even plus 10 percent** – The lease price is based on management and costs associated with the lease operation plus 10 percent to cover unforeseen costs and the need for the lease to cover operational costs and land taxes.
- ✓ **Habitat valuation** – The lease price is determined from a subjective rating of the quality and quantity of wildlife habitat available. For example, if the wildlife habitat and populations have been managed to provide high populations of wildlife and better than average hunting opportunities, the value of the lease may be higher, or if the lessee(s) want to limit or keep out other hunters that the property could reasonably sustain, they may have to pay a premium price for that.
- ✓ **Baseline plus value-added** – You charge a base price per acre plus charges on improvements made, amenities, or services provided.
- ✓ **Competitive pricing** – You base the lease price on the going rate of other leases in the area or lease prices charged elsewhere for similar access, services, and amenities provided.
- ✓ **Sealed bid** – This is similar to timber sales in that you develop a description of the hunting lease and what it offers, and you request sealed bids. You can do this via advertising or by contacting individuals or sportsmen groups who may have an interest.

## HOW TO FIND A RESPONSIBLE LESSEE

It may be difficult to identify and locate responsible hunters who will take an interest in the land and resources being leased and who will respect the property and abide by terms and conditions in a written lease. It will pay dividends in the long-term, however. Without appropriate screening of lessee(s), you may find yourself with an unmanageable group who have no regard for your rights or maintaining the property and the sustainability of the habitat and wildlife. Many problems could arise, such as trash dumping, wildfires, road and tree damage, illegal hunting, damage to facilities and livestock, and over harvest of the game resource. For the most part, you can avoid these problems by using these practices:

- ✓ leasing to known sportsmen with some local members
- ✓ developing and using a well-constructed written lease that protects your interests and that every member, if the club or group is not incorporated, must sign, or if incorporated, that the representative makes sure every member has read and understands.

Remember that after you locate interested lessee(s) ask them to provide a list of references, and use this list to ensure they have not had problems in the past leasing lands from other landowners and are known to be responsible and ethical sportsmen. If the lessee(s) pass this background check, conduct a personal interview with the lessee(s) or their representative, if the group is incorporated. Develop a list of questions in advance that you want to have answered, and don't be afraid to ask tough questions. Then use all the information to make an informed decision about leasing to the lessee(s) and if you think they are willing to accept and abide by the terms of the written lease agreement.

### ■ *Trespass*

Mississippi law forbids all persons to enter private lands without permission from the landowner. Hunting, fishing, or trapping on land without permission of the landowner is a misdemeanor punishable by a fine and possible imprisonment. The trespass law is enforceable by conservation officers and county sheriffs.

## SUMMARY

Recreational access leases have become an important source of alternative income for many forest and agricultural landowners in the South as well as in other parts of the United States. Most forest industry landowners and managers now consider income from recreational access leases as a vital part of their resource and financial decision-making process.

If you as a private landowner consider such leases as an alternative enterprise to supplement your income, you should understand the advantages and disadvantages of the leases. You also must consider and remember you are not selling wildlife, which is publicly owned. You are selling the opportunity and privileges that go with access to your land for the purposes specified in the written lease agreement. Having some idea of the habitat quality and status of wildlife populations on your land will be important in making decisions. The sustainability of

your renewable resources is the key to long-term income potential as well as sustainability of the operation. Recreational access/hunting leases can become an enjoyable and rewarding experience for you (lessor) and sportsmen (lessees) with advance planning, preparation, management, and communication.

As far as the economic potential of hunting leases, the range of returns varies considerably based on the type of lease. One example would be high quality waterfowl blinds leases that bring the highest annual returns per acre of access, versus leases for small game hunting that may be as low as 50¢ per acre, to high quality big game leases that may go for as much as \$25.00 per acre or more in some areas. A recent study of fee hunting in Mississippi reported that for the 1997-98 season, annual net revenues averaged \$3.91 per acre statewide by landowners leasing their lands for hunting.





## SAMPLE HUNTING LEASE AGREEMENT

This hunting lease agreement is for educational purposes only. It is important to check with your attorney before writing and signing a binding legal agreement. You may want this lease to be more detailed or include more requirements, or you may want it to be less detailed. If you want to provide other services or rights, such as guides, cleaning game, or allowing the lessee to improve the habitat, you should include those provisions.

STATE OF:

COUNTY OF:

TRACT:

This Lease Agreement (the "Lease") entered into as of the day of \_\_\_\_\_, by and between \_\_\_\_\_ hereinafter referred to as Lessor, and \_\_\_\_\_ a/an (state whether an individual, a partnership, corporation, or unincorporated association) hereinafter referred to as Lessee.

The Lessor agrees to lease the Hunting Rights, as defined below, on \_\_\_\_\_ acres more or less, to Lessee for \_\_\_\_\_ (\$\_\_\_\_\_/Acre), for a term commencing on \_\_\_\_\_, (the "Commencement Date") and ending on \_\_\_\_\_ (the "Expiration Date") on the following described property (the "Land").

### See Attached Description

The Hunting Rights shall consist of the exclusive right and privilege of propagating, protecting, hunting, shooting and taking game and waterfowl on the Land together with the right of Lessee to enter upon, across and over the Land for such purposes and none other.

This Hunting Lease Agreement shall be subject to the following terms and conditions:

#### **PAYMENT**

1. The Lessee shall pay to the Lessor \_\_\_\_\_, the amount of one (1) year's Rent in full, on or before \_\_\_\_\_ by check payable to Lessor.

#### **COMPLIANCE WITH LAW**

2. Lessee agrees for itself, its licensees and invitees to comply with all laws and regulations of the United States and of the State and Local Governments wherein the Land lies relating to the game or which are otherwise applicable to Lessee's use of the Land. Any violation of this paragraph shall give Lessor the right to immediately cancel this Lease.

#### **POSTING**

3. Lessee shall have the right to post the Land for hunting to prevent trespassing by any parties other than Lessor, its Agents, Contractors, Employees, Licensees, Invitees, or Assigns provided that Lessee has obtained the Lessor's prior written approval of every sign designed to be so used. Every such sign shall bear only the name of the Lessee. Lessor reserves the right to prosecute any trespass regarding said Land but has no obligation to do so.

## **LESSOR'S USE OF ITS PREMISE**

4. Lessor reserves the right in itself, its Agents, Contractors, Employees, Licensees, Assigns, Invitees, or Designees to enter upon any or all of the Land at any time for any purpose of cruising, marking, cutting or removing trees and timber or conducting any other acts relating thereto and no such use by Lessor shall constitute a violation of this Lease. This right reserved by Lessor shall be deemed to include any clearing, site preparation, controlled burning and planting or other forestry work or silvicultural practices reasonably necessary to produce trees and timber on the Land. Lessee shall not interfere with Lessor's rights as set forth herein.

## **GATES/BARRIERS**

5. Lessor grants to Lessee the right to install gates or other barriers (properly marked for safety) subject to the written permission of Lessor and the terms and conditions relating thereto as set forth elsewhere in the Lease, on private roads on the Land, and Lessee agrees to provide Lessor with keys to all locks prior to installation and at all times requested by Lessor during the term of this Lease.

## **ROAD OR FENCE DAMAGE**

6. Lessee agrees to maintain and surrender at the termination of this Lease all private roads on the Lands in at least as good a condition as they were in on the date first above-referenced. Lessee agrees to repair any fences or other structures damaged by itself, its licensees or invitees.

## **ASSIGNMENT**

7. Lessee may not assign this Lease or sublease the hunting rights the subject of this Lease without prior written permission of Lessor. Any assignment or sublease in violation of this provision will void this Lease and subject Lessee to damages.

## **FIRE PREVENTION**

8. Lessee shall not set, cause or allow any fire to be or remain on the Land. Lessee covenants and agrees to use every precaution to protect the timber, trees, land, and forest products on the Land from fire or other damage, and to that end, Lessee will make every effort to put out any fire that may occur on the Land. In the event that any fire shall be started or allowed to escape onto or burn upon the Land by Lessee or anyone who derives his/her/its right to be on the Land from Lessee, Lessor shall have the right immediately to cancel this Lease without notice, and any payments heretofore paid shall be retained by Lessor as a deposit against actual damages, refundable to the extent such damages as finally determined by Lessor are less than said deposit. In addition, Lessor shall be entitled to recover from Lessee any damages which Lessor sustains as the result of such fire. Lessee shall immediately notify the appropriate state agency and Lessor of any fire that Lessee becomes aware of on Lessor's lands or within the vicinity thereof.

## **INDEMINIFICATION AND INSURANCE**

9. Lessee shall indemnify, defend and hold harmless Lessor, its directors, officers, employees and agents from any and all loss, damage, personal injury (including death at any time arising therefrom) and other claims arising directly or indirectly from or out of any occurrence in, or upon, or at the said Lands or any part thereof relating to the use of said Land by Lessee, Lessee's invitees or any other person operating by, for or under Lessee pursuant to this Lease. Lessee further agrees to secure and maintain a \$1,000,000 public liability insurance policy in connection with the use of the Land with Lessor named as

insured and with such insurance companies as shall be agreeable to Lessor. This indemnity shall survive the termination, cancellation or expiration of this Lease.

## **RULES AND REGULATIONS**

10. Lessor's rules and regulations attached hereto as Exhibit "A" are incorporated herein by reference and made an integral part hereof. Lessee agrees that any violation of said rules and regulations is a material breach of this Lease and shall entitle Lessor to cancel this Lease as its option effective upon notice by Lessor to Lessee of such cancellation.

Lessor reserves the right from time to time, to amend, supplement or terminate any such rules and regulations applicable to this Lease. In the event of any such amendment, supplement, or termination, Lessor shall give Lessee reasonable written notice before any such rules and regulations shall become effective.

## **MATERIAL TO BE SUBMITTED TO LESSOR**

11. If this Lease is executed by or on behalf of a hunting club, Lessee shall provide Lessor, prior to the execution hereof, a membership list including all directors, officers, and/or shareholders, their names and addresses and a copy of Lessee's Charter, Partnership Agreement and By-Laws, if any. During the term of this Lease, Lessee shall notify Lessor of any material change in the information previously provided by Lessee to Lessor under this paragraph 11.

## **LESSEE'S LIABILITY RE: TREES, TIMBER, ETC.**

12. Lessee covenants and agrees to assume responsibility and to pay for any trees, timber or other forest products that may be cut, damaged, or removed from the Land by Lessee or in connection with Lessee's use of the Land or any damages caused thereupon.

## **NO WARRANTY**

13. This Lease is made and accepted without any representations or warranties of any kind on the part of the Lessor as to the title to the Land or its suitability for any purposes; and expressly subject to any and all existing easements, mortgages, reservations, liens, rights-of-way, contracts, leases (whether grazing, farming, oil, gas or minerals) or other encumbrances or on the ground affecting Land or to any such property rights that may hereafter be granted from time to time by Lessor.

## **LESSEE'S RESPONSIBILITY**

14. Lessee assumes responsibility for the condition of the Land and Lessor shall not be liable or responsible for any damages or injuries caused by any vices or defects therein to the Lessee or to any occupant or to anyone in or on the Land who derives his or their right to be thereon from the Lessee.

## **USE OF ROADS**

15. Lessee shall have the right to use any connecting road(s) of Lessor solely for ingress, egress, or regress to the Land; such use, however, shall be at Lessee's own risks and Lessor shall not be liable for any latent or patent defects in any such road nor will it be liable for any damages or injuries sustained by Lessee arising out of or resulting from the use of any of said Lessor's roads. Lessee acknowledges its obligation of maintenance and repair for connecting roads in accord with its obligation of maintenance and repair under paragraph 6.

### **SURRENDER AT END OF TERM**

16. Lessee agrees to surrender the Land at the end of the term of this Lease according to the terms hereof. There shall be no renewal of this Lease by implication or by holding over.

### **MERGER CLAUSE**

17. This Lease contains the entire understanding and agreement between the parties, all prior agreements between the parties, whether written or oral, being merged herein and to be of no further force and effect. This Lease may not be changed, amended or modified except by a writing properly executed by both parties hereto.

### **CANCELLATION**

18. Anything in this Lease to the contrary notwithstanding, it is expressly understood and agreed that Lessor and Lessee each reserve the right to cancel this Lease, with or without cause, at any time during the Term hereof after first giving the other party thirty (30) days prior written notice thereof. In the event of cancellation by Lessee, all rentals theretofore paid and unearned shall be retained by the Lessor as compensation for Lessor's overhead expenses in making the Land available for lease, and shall not be refunded to Lessee.

### **APPLICABLE LAW**

19. This Lease shall be construed under the laws of the State first noted above.

IN WITNESS WHEREOF, the parties have hereunto caused this Agreement to be properly executed as of the day and year first above written.

WITNESSES:

## SAMPLE HUNTING LEASE AGREEMENT

This hunting lease agreement is for educational purposes only. It is important to check with your attorney before writing and signing a binding legal agreement. You may want more details or fewer details than this lease includes. If you want to provide other services or rights, such as guides, cleaning game, or allowing the lessee to improve the habitat, they should be included.

\_\_\_\_\_, owner of \_\_\_\_\_ farm, (legal description of the land), County, (state), herein referred to as "Landowner," for good and sufficient consideration, as hereinafter set forth, leases hunting rights on those portions of the \_\_\_\_\_ farm, hereinafter described, to \_\_\_\_\_ and others so executing this agreement and hereinafter referred to as "Lessees," on the following terms and conditions:

1. The tract of land, hereinafter referred to as "lease" upon which hunting rights are granted, is the \_\_\_\_\_ farm described herein consisting of approximately \_\_\_\_\_ acres.

*(description of land with aerial photograph if available)*

Lessees understand the location and boundaries of said tract and agree that no hunting rights are granted hereunder on any tract other than the tract herein designated and that no hunting or discharging of firearms shall be done by Lessees while traveling to or from the lease.

2. This agreement and the rights and duties granted and incurred hereunder shall be for a term commencing with the opening of \_\_\_\_\_ season in 20\_\_\_\_, and the closing of \_\_\_\_\_ season in 20\_\_\_\_, as set for \_\_\_\_\_ County, (state), under regulations enforced by the (state wildlife agency) unless terminated pursuant to provisions of this agreement hereinafter set forth. Provided that either the Landowner or Lessee may cancel this agreement by giving written notice of its intent to do so thirty (30) days prior to the date that rental for the second or third year of the term here provided is due. In which event, Lessee shall be relieved of the obligation to pay further rental under the terms and shall deliver possession of the premises.
3. The consideration to be paid by Lessee to Landowner at \_\_\_\_\_ County, (state), is \$\_\_\_\_\_ in cash, one-half to be paid on or before June 1, 20\_\_\_\_, and the balance to be paid on or before October 1, 20\_\_\_\_. Failure to pay the second installment shall thereupon terminate and cancel the lease and the amount already paid shall be forfeited as liquidated damage for the breach of the agreement. A \$\_\_\_\_\_ deposit will be required to insure that lease premises are left in a clean and orderly condition. Farm personnel will inspect the premises within 30 days after the lease expires. If cleanup is necessary, the farm will accomplish such, and the \$\_\_\_\_\_ deposit will be forfeited by the Lessees. If the premises are determined by farm personnel to be clean and orderly, the \$\_\_\_\_\_ deposit will be returned to the Lessees within 60 days after expiration of the lease.
4. Lessees shall not assign this lease or sublet the leased premises without the written consent of \_\_\_\_\_.

5. Lessees shall at all times abide by and obey all state and federal hunting laws and regulations and Lessee shall be responsible for the conduct of Lessee's guests or members in connection with said hunting laws and shall be responsible for any violation of said hunting laws or regulations by said Lessee, its guests, or members. Any violation of the hunting laws or regulations of any governmental authority shall give rise to the right of immediate cancellation of this lease by the Landowner upon written notice to Lessees, and in the event of the cancellation of said lease due to violation of game laws by Lessees, its guests or members, no prorata of the rent previously paid shall be made, same to be forfeited as liquidated damages, and Lessees shall, upon receipt of such notice, immediately vacate and surrender unto the Landowner possession of the leased premises.

Lessees shall, during the period in which it has access to the leased premises, continually protect same against trespassers and squatters, and to the best of Lessee's ability have such persons apprehended and prosecuted.

6. This lease agreement is expressly made subject to the "General Conditions of the Lease," which are attached hereto as Exhibit "A," and made a part hereof for all purposes the same as if copied herein verbatim.
7. If Lessees default in the performance of any of the covenants or conditions hereof, including the "General Conditions of Lease," which are attached hereto as Exhibit "A," then such breach shall cause an immediate termination of this lease and a forfeiture to Landowner of all consideration prepaid. The Lessee shall have no further rights under the term of this lease agreement. In the event a lawsuit arises out of or in connection with this lease agreement and the rights of the parties thereof, the prevailing party may recover not only actual damages and costs but also reasonable attorneys' fees expended in the matter.
8. Landowner shall not be liable for any injuries, deaths, or property damage sustained by (1) any Lessees hereto, (2) any employees of Lessees, (3) any business invitees of Lessees, (4) any guest of Lessees, (5) any person who comes to the leased premises with the express or implied permission of Lessees on the \_\_\_\_\_ farm with permission of the Lessee hereunder except for such injury, death, or property damage as may be sustained directly as a result of Landowner's sole negligence. Lessee hereunder jointly and severally agrees to indemnify Landowner, his agents or employees against any claim asserted against Landowner or any of Landowner's agents or employees as a result of personal injury, death or property damage arising through: (1) the negligence of a Lessee or any persons on the farm with the permission of a Lessee, or (2) through the concurrent negligence of a Landowner or his agents or employees any one or more of Lessees or any person on the \_\_\_\_\_ farm with the permission of the Lessee.

All minors permitted by Lessee to hunt, fish, or swim on the leased premises shall be under the direct supervision of one of their parents (or guardian) and when children are present on the leased premises, the parents shall be fully responsible for their acts and safety and agree to hold Landowner harmless therefor, regardless of the nature of the cause of damage, whether property or personal injury, to themselves or others.

9. The leased premises are taken by Lessee in an “as is” condition, and no representation of any kind is made by \_\_\_\_\_ regarding the suitability of such premises for the purpose for which they have been leased.
10. This lease may not be terminated or repudiated by Lessee except by written notice signed and acknowledged in duplicate before a Notary Public by Lessee, and such termination or repudiation shall not be effective until Lessee has mailed one executed copy thereof to Landowner by registered mail and filed the other executed copy thereof for record in the Office of the County Clerk, \_\_\_\_\_ County, (state). This lease shall be binding upon the distributees, heirs, next of kin, successors, executors, administrators, and personal representatives of each of the undersigned. In signing the foregoing lease, each of the undersigned hereby acknowledges and represents:

- (a) That he has read the foregoing lease, understands it, and signs it voluntarily; and
- (b) That he is over 21 years of age and of sound mind;

In witness whereof, the parties have set their hands this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

LESSEES:	DATE:	LANDOWNER:	DATE:
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	WITNESS:	DATE:
_____	_____	_____	_____
_____	_____	_____	_____

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The foregoing instrument was subscribed, sworn to, and acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ and \_\_\_\_\_.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
*Notary Public*

**EXHIBIT "A," GENERAL CONDITIONS OF LEASE  
(EXAMPLES OF OPTIONAL CLAUSES)**

\_\_\_\_\_ LANDOWNER, LEASE TO \_\_\_\_\_ LESSEE

These general conditions of lease are applicable to the lease agreement between \_\_\_\_\_, hereinafter referred to as LANDOWNER, and \_\_\_\_\_, LESSEE. Lessee and all persons authorized to Lessee to hunt upon the leased premises shall be hereinafter collectively referred to as "Hunters."

1. It will be the responsibility of the Lessee to furnish each hunter or guest with a copy of these general conditions of lease.
2. Lessees understand and agree that the leased premises are not leased for agricultural or grazing purposes and, consequently, taken subject to the rights thereof.
3. Lessee acknowledges that Landowner owns the property herein leased, primarily for agricultural purposes and the growing of timber. Lessee shall in no manner interfere or obstruct Landowner's farming, forestry, or livestock operations.
4. Landowner reserves the right to deny access to the leased premises to any person or persons for any of the following reasons: drunkenness, carelessness with firearms, trespassing on property of adjoining landowners, acts which could reasonably be expected to strain relationships with adjoining landowners, or any other activities which to the ordinary person would be considered objectionable, offensive, or to cause embarrassment to Landowner or be detrimental to Landowner's interest. Failure of Lessee to expel or deny access to the premises to any person or persons after being notified to do so by Landowner may result in the termination of this lease at discretion of Landowner.
5. No hunter shall be allowed to:
  - (a) Shoot a firearm from a vehicle;
  - (b) Erect a deer stand within 150 yards of the boundary of the herein leased premises;
  - (c) Permanently affix a deer stand in trees;
  - (d) Abuse existing roads by use of vehicles during wet or damp conditions.
  - (e) Fire rifles or other firearms in the direction of any house, barn, other improvements or across any haul road located on the leased premises;
  - (f) Build or allow fires on the leased premises, except in those areas specifically designated by Landowner in writing, and, in event, shall be kept fully liable for such fires; and
  - (g) Leave open a gate found closed or close a gate found open.
6. Hunters shall at all times maintain a high standard of conduct acceptable to \_\_\_\_\_.



## HUNTING CLUB BYLAWS

Hunting Club bylaws should contain provisions that govern the day-to-day operation of the club. The bylaws should be adapted to local conditions that affect the club, its relationship with landowners(s), and the well-being of the land and wildlife resources. You should keep the bylaws as simple, concise, and understandable as possible for the benefit of the members and yourself. Some clubs develop bylaws that are too complex and too extensive for the basic needs and are too difficult to manage or enforce adequately. Bylaws should be written to be basic to the operation of the club or group's interest and to add others as needed based on the club/group's growth, changing needs, changing wildlife regulations, or changes you need. Some examples of items that need to be considered when drafting bylaws are as follows:

- ✓ Guest privileges and/or regulations.
- ✓ Safety for members, for the landowners, and/or property.
- ✓ Land management and stewardship of the property.
- ✓ Appropriate disciplinary procedures for all members and guests, if allowed.
- ✓ Rules of the hunt for all participants.
- ✓ Strict adherence to all state and federal wildlife regulations.
- ✓ Functional/operational committees, such as camp operation and maintenance, stand or blind placement and maintenance, food and cooks for organized hunts, and such.
- ✓ Maintenance of appropriate member and landowner(s) relations.
- ✓ If management for quality deer management is a club/group objective, this needs to be made clear in the bylaws.
- ✓ Any club/group self-imposed management requirements, such as no dogs, use of trailing dogs for retrieving cripples, or for chasing deer. Also consider if other species are allowed to be hunted during regulated seasons, such as turkey, squirrels, raccoons, waterfowl and such, and doves.

Obviously hunting club/group bylaws are essential for many organized hunting operations, and if you have concerns about the legality of the bylaws and their enforcement, you may consult a lawyer. Clearly one of the most important considerations must be that all members and invited guests must understand and agree in writing to the adopted bylaws for them to be useful and effective. The items listed above for consideration are not all you need to consider. The list can be expanded based on the desires and needs of you and the membership.

## LIABILITY INSURANCE FOR LANDOWNERS AND HUNTING CLUBS

Insurance is a contract where an insurer (insurance company) undertakes to protect the insured (person purchasing the insurance) against loss, damage, or liability from an unknown or possible event. The insured pays the insurer a premium for this coverage.

Liability insurance covers loss because of negligence. It does not cover loss because of an intentional act. You can greatly reduce negligence on most private lands through risk planning.

Liability insurance companies generally limit the total liability of the insurance company to a certain amount, which may be much less than the insured person may suffer. Therefore, liability insurance may not completely eliminate the loss that occurs, but it does reduce the risk of loss.

If you already have liability insurance on your property, you may be able to work with your insurer to add liability coverage for a hunting lease. Your insurer may require that the hunting club or lessees get liability insurance as part of the written lease agreement. You may want to prepare or have an attorney prepare a hunting club disclaimer that all hunting club members or lessees must sign that points out potential risks on the land. Some of these might be an abandoned well, livestock that may need to be avoided, and such. Disclaimers may not be legal, but they do serve to warn lessees of potential risks and may prevent a liability suit if the lessees ignore the identified risks they signed a waiver for.

Many insurance companies offer liability for hunting clubs or for landowners who lease their land for hunting or other recreational access. **The following list by no means includes all sources of information, but it does provide some sources of information about liability insurance, coverage, costs, and comparisons.** Another source you should not overlook is a rider to existing policies to cover recreational access including hunting.

If someone pays for access to your land to hunt or fish or other recreational use, you owe that person certain duties of care, such as posting warnings as to dangerous conditions on the property, including potentially dangerous animals, abandoned wells, old buildings, and other structures. You may be liable for injuries to a hunter caused by another hunter if not you are not covered by insurance. For example, liability may be based on your negligence if you allow too many hunters in a given area, or if you admit an intoxicated hunter who injures another hunter.

### ■ *Some Known Sources of Liability Insurance*

#### **Southeastern Wildlife Federation's Hunting Club Liability Insurance Program**

Contact – Ms. Carol Cash Turner, Insurance Agent, Southeastern Wildlife Federation, P.O. Box 1109, Montgomery, Alabama 36102. Telephone: (334) 832-9453. Premium rates are based on the number of members in the club and the limit of liability selected. SWF offers liability limits of \$300,000, \$500,000 and \$1,000,000 in either Limited or Broad form. The Limited form excludes occurrences between members and/or guests. The Broad form also has \$25,000 Fire Legal Timber coverage. Both forms include a \$25,000 Accidental Death benefit and a \$1,000 medical Expense benefit for each member. There are no hidden charges, and as many as four landowners may be listed as “Additional Insured” at no extra cost. For any landowners over four, the cost per landowner is \$10 plus tax.

#### **Davis-Garvin-Agency**

Contact – Dr. Ed Wilson, Account Executive, P.O. Box 21627, Columbia, South Carolina 29221-9961. Telephone: (800) 845-3163, or (803) 732-0060. This agency provides two types of hunting lease liability packages: (1) for an individual hunting club; or (2) for a landowner with a large acreage or groups of landowners representing large acreages. The premium for hunting clubs is determined by the number of members and

guests, with the minimum premium being \$364 for a \$1 million per occurrence liability limit. The premium for large properties or groups of landowners is determined by the acreage involved, with the minimum acreage being 10,000 acres. The rate for a \$1 million per occurrence liability limit varies from 24¢ per acre plus tax for 10,000 to 49,000 acres to 17¢ per acre plus tax for 50,000 + acres.

**Bramlett Agency**

1000 Energy Center, Suite 104, P.O. Box 369, Ardmore, Oklahoma 73042, (405) 223-7300. This company sells liability insurance for most types of hunting leases.

**ISERA (International Special Event and Recreation Association)**

Contact – Jim Quist, Underwriting Specialist, 8722 South Harrison Street, Sandy, Utah 84070. Telephone (toll free): (877) 678-7342 or (801)-304-3735. This company insures primarily shooting preserves and shooting ranges.

**Worldwide Outfitters and Guide Association, Outfitters and Guides Underwriters Inc.**

Contact – Jim Quist, 8722 South Harrison Street, Sandy, Utah 84070. Telephone (toll free): (877) 678-7342 or (801) 304-3735. This company insures primarily guides and outfitters for a variety of outdoor recreation activities, including hunting and fishing.

**Outdoor Underwriters, Inc.**

Contact – R. Tim Reed, CLU, Outdoor Recreation Insurance, P.O. Box 431, Wheeling, West Virginia 26003. Telephone: (800) 738-1300. This company is affiliated with the Philadelphia Insurance Companies and insures guides, outfitters, hunting clubs, and landowners with hunting leases for up to \$1,000,000 per occurrence.

These are just some examples. Many other insurers may offer such insurance, including your present property insurer through an additional rider. However, the above contacts provide the opportunity to contact these insurers and compare coverage and costs.

*For more information, these publications are available from your county Extension office:*

P2308 – Natural Resource Enterprises – Wildlife and Recreation, A Checklist of Considerations

P2310 – Natural Resource Enterprises – Wildlife and Recreation, Hunting Leases

SRAC #479a – Fee Fishing: An Introduction

SRAC #480 – Fee Fishing Ponds: Management of Food Fish and Water Quality

SRAC #481 – Development and Management of Fishing Leases

SRAC #482 – Fee Fishing: Location, Site Development, and Other Considerations

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NATURAL RESOURCE ENTERPRISES

# Managing Kentucky Fee Fishing Operations

**Forrest Wynne**

Kentucky State University, Graves Coop. Cooperative Extension Service, Mayfield, Kentucky

*Abstract:* Management strategies for operating fee fishing operations in Kentucky are described. Recommendations are given for stocking rates of catfish, hybrid bream, and trout; aeration, pond depth and shape, supplemental feeding, and other management considerations. Marketing considerations discussed include pricing, and amenities such as restrooms, fish-cleaning services, and concessions including rental or sale of tackle and supplies.

*Key Words:* catfish, fee fishing, Kentucky, management, marketing, ponds

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There are approximately 175 privately owned fee fishing operations in Kentucky. Fee fishing facilities may often be referred to as pay lakes or fish-out ponds. Fee fishing operations usually consist of one or more ½- to 10-acre ponds. The Kentucky Department of Fish and Wildlife Resources (KDFWR) requires fee fishing operators to stock a minimum of 1,000 lbs of adult catfish per surface acre of water, at least once a year. The KDFWR charges a license fee of \$125 for the first two pond surface acres. A fee of \$20 is charged for each additional surface acre of pond(s). Registered fee fishing operations are provided with daily licenses for customers. Yearly fishing licenses are required when fishing at non-permitted facilities.

Fee fishing ponds are typically stocked with 1- to 4-lb channel catfish at densities of 1,000 - 4,000 lbs per surface acre. Kentucky fee fishing ponds are often stocked with 300 lbs of fish or more, on a Thursday or Friday. Customers often observe weekly stockings. The fish are bought from live hauler trucks at prices of \$0.70 - \$1.85 per lb. The price of fish paid by fee fishing operations is often dependent on the quantity of fish ordered and the distance they must be transported.

High fish densities and aeration helps insure fishing success. Aeration devices and water testing equipment should be used by operators that stock  $\geq 1,000$  lbs of fish per surface acre. Aeration devices should be placed so they can operate effectively but provide as little inconvenience and potential danger to customers as possible. Electric aeration devices rated at 1 hp per acre may be placed on timers and used for supplemental aeration. Larger gasoline or diesel-powered aerators may be more desirable for severe oxygen depletions and other emergency situations.

Typical lakes and ponds may produce 20 - 200 lbs of fish per surface acre. Many of these fish may be undersized or be of an undesired species. Fee fishing lakes provide an alternative fishing resource for those who are not interested in utilizing, or who are unable to utilize, more natural fisheries (Cichra et al. 1994a). Kentucky's fee fishing industry annually imports an estimated 2 million lbs of catfish from other southern states. Roughly 6% of the fish required for stocking these ponds are grown in-state.

Fee fishing operations will accept frequent, small deliveries of variable size fish and provide a local market for beginning and small-scale catfish producers. Fee fishing markets have provided a vital link in establishing the pond-raised catfish industry in other southern states. One or two fee fishing operations exist in many Kentucky counties. Some of these facilities are located near large population centers. However, many successful operations exist in more rural areas. A 1984 fee fishing survey (Cremer et al. 1984) indicated 42% of Kentucky customers fished alone, while 44% fished in family groups. Most customers were male and traveled from local or nearby areas.

Irregular shaped ponds of ½ to 2 acres provide a more natural and aesthetic fishing environment and these smaller ponds are easier to manage. Two or three ponds provide management advantages over a single pond operation. If fish are off-flavor, become diseased, will not bite, or if pond repairs are needed, the business will not be forced to temporarily close while the issue is addressed. Drain structures should be

installed to allow rapid pond draining. Shallow pond areas (<2 feet in depth) should be avoided, since they tend to promote aquatic plant growth. Triploid grass carp may be stocked to control soft-stemmed aquatic plants; however, these fish can reach large sizes and are periodically caught by hook and line. If possible, fee fishing ponds should be constructed with a 3- to 5-foot depth. A smooth pond bottom permits the seining and removal of non-biting fish. The numbers of non-biting, or hard-to-catch catfish has been estimated to be as high as 40% in fee fishing ponds (Cichra 1999).

Good parking facilities and a combination ticket/concession stand should be located at the main entrance. Fee fishing operations should have limited access, for security purposes. Property liability insurance may be considered, or accident release forms should be signed as customers enter the property.

The Kentucky fee fishing season typically runs from the middle of March to early November. Some fee fishing operations are open 24 hours, 7 days a week. Others have limited hours or are open Thursday through Sunday. Businesses charge either a general admission fee of about \$5 to \$7 per day (called "Ticket Lakes"), or charge a lower admission fee of \$2 to \$3 and an additional \$1.25 to \$1.85 per pound for fish caught (called "Pound Lakes"). Selling fish by the pound provides more accurate fish stock records, but it requires an attendant to weigh the fish as customers leave. Customers should be discouraged from returning captured fish to the pond, since they often do not survive.

Bonus ponds may be stocked with hybrid bream or large catfish. Rainbow trout may be stocked during the fall, winter, and spring months when water temperatures remain below 68° F. Bonus ponds have been used successfully to attract fee fishing customers. Stocking largemouth bass, crappie, shad, bluegill, and other fish into fee fishing ponds can make pond management difficult and should be avoided.

Catfish will "take the hook" better if they are fed less than 1% of their body weight per day (Masser et al. 1993). Feeding will allow the fish's immune system to combat disease and to maintain its body weight. Supplemental feeding will keep the fish healthier, making them hungrier. Convincing fee fishing customers of the benefits of supplemental feeding may be difficult. Feeding may especially discourage customers fishing in general admission lakes, as opposed to those lakes which charge by a per-pound basis. Night feeding using a sinking feed, feeding when the operation is closed, or choosing not to feed may be the best management policy, depending on the clientele.

Fee fishing operations make most of their profits from the sale of concession items. Fishing tackle, worms, chicken livers, stink baits, soft drinks, and candy are commonly sold. Fishing rods and reels may be sold or rented. Spinning or spin casting gear is most frequently used. Security deposits may help discourage rental equipment vandalism. Many fee fishing operations use holding tanks to sell additional fish to fishermen or to customers not interested in fishing. Some fee fishing operations will accept food stamps.

Fish cleaning (\$0.25 to \$0.50 per lb of fish) and food vending services are often provided. Adequate restroom facilities are necessary to insure the success of an operation. Consult the county health department about existing regulations regarding these types of facilities. Some fee fishing operations provide alternative activities for non-fishermen such as pony rides, game rooms, playgrounds, camping, etc.

Aesthetics, facility cleanliness, and safety are important details which can determine an operation's success. Providing paved or gravel pond banks that are clear of vegetation near the water's edge will improve accessibility. Benches, picnic tables, shelters, and shade trees may be located a short distance from the pond. Litter containers and life saving gear should be readily accessible. Entrance signs displaying regulations, such as the limit of two fishing rods per fishermen, fish size or quantity limits, and prohibiting the use of alcohol, abusive language etc., are useful management tools.

Many fee fishing operations depend on repeat customers and word of mouth advertising to attract business (Cichra et al 1994b). Attractive roadside signs as well as radio, television, and newspaper advertisements may also attract customers. A fee fishing operation's success will depend on the manager's ability to run a business and manage the public, in addition to managing the fish health. It is important to remember that fee fishing customers expect to catch fish!

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Southern  
Regional  
Aquaculture  
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November 1994

## Fee-Fishing An Introduction

Charles E. Cichra, Michael P. Masser and Ronnie J. Gilbert\*

Fishing is the number one recreational pastime in the United States. The U.S. Department of the Interior estimated that 35.6 million anglers spent \$24 billion in 1991. The increasing demand on already over-utilized public fishing waters provides an opportunity for the development and expansion of commercial fishing facilities. "Fee-fishing," the practice in which anglers pay for the right to fish or for any fish that are caught, can bridge the supply shortfall for quality fishing opportunities, especially near urban areas. Fee-fishing can provide profits for the owner, social and recreational benefits for the community, and a market for locally produced fish.

Many privately owned ponds are seldom fished and often underharvested. These can be turned into alternative sources of revenue for the pond owners. In addition, many sites exist for new ponds that can be specifically designed, constructed and managed for fee fishing.

Fee-fishing is appealing to a variety of individuals, including ex-

perienced anglers who seek particular species, anglers who like to fish but are limited by time or resources, families with small children, the physically challenged and the elderly. Fee-fishing can be attractive to tourists or individuals that fish only occasionally, since most states do not require anglers to have a license to fish in fee-fishing ponds.



Figure 1. Fishing rights on larger ponds with quality fishing can be leased on a long-term basis.

### Types of fee-fishing operations

There are three basic types of fee-fishing operations: (1) long-term leases; (2) day leases or "ticket" lakes and (3) "fish-out" ponds, "pound" lakes or "pay-by-the-pound" lakes. Long-term leasing involves the leasing of exclusive fishing rights on a long-term basis similar to hunting leases to an individual or group (Figure 1). Fishing success relies on natural production of the leased water body. Day leasing involves collecting a daily use fee from anglers, allowing access to a given water body. Both natural production and occasionally stocked fish support the angler's harvest. Fish-out ponds are stocked with high densities of catchable-size fish. The angler is then charged for each fish caught or limited as to the number that can be taken. More information can be found in SRAC Publication Numbers 480 (*Fee-fishing Ponds: Management of Food Fish and Water Quality*), 481 (*Development and Management of Fishing Leases*) and 482 (*Fee-Fishing: Location, Site Development and Other Considerations*).

\*Respectively, Extension Fisheries Specialist, University of Florida; Extension Fisheries Specialist, Auburn University; and Extension Aquaculture Specialist, University of Georgia.



## Long-term leasing

Long-term leasing usually involves quality fishing for large-mouth bass or panfish, such as bluegill, redear sunfish and crappie. Location and aesthetics are often the most important selling points. Many people fish to relax and escape the hustle and bustle of daily life. They want a quality fishing experience and are willing to pay for it. Unlike hunting leases, which generally require a large tract of land to support adequate game, fishing leases can be small. With proper management, each acre of water can support 300 to 400 pounds of harvestable-size sportfish, providing many hours of productive fishing.

Major steps involved in leasing the fishing rights to a pond include: (1) locating suitable lessee, (2) establishing terms of the lease and (3) executing the written lease.

Interested parties can be located through word of mouth, newspapers or magazine advertisements. The amount of effort and money expended in locating possible lessees should depend on the quality of the fishing and the location and visual attractiveness of the site. These factors will determine the value of the lease. A trophy bass fishery, located at an attractive site and close to a large metropolitan area, will bring top dollar.

The lease should spell out exactly the rights and responsibilities of each party including:

- 1) who will have access/fishing rights to the pond;
- 2) how long the lease will be in effect;
- 3) the price;
- 4) under what conditions the lease can be broken;
- 5) any fishing limits or regulations that are to be followed;
- 6) other privileges such as camping or swimming;

- 7) what management practices will be followed such as aquatic weed control, water level drawdown and stocking;
- 8) who will pay for each management option;
- 9) how much liability insurance will be required and who will pay for it; and
- 10) what privileges will be retained by the owner.

A written lease should be prepared with the advice of an attorney, certified public accountant, fisheries biologist and/or other professionals.

Major costs to the pond owner are locating a lessee and drawing up the lease. Any work requested by the lessee should be paid by the lessee. Annual returns can vary from less than \$100 to almost \$100,000. Lease prices vary primarily due to the size of the water body and quality of fishing, but also because of site location and configuration, and demand.

A long-term lease can be advantageous to the landowner. The owner only deals with a few individuals on an occasional basis, minimizing labor. In addition, the landowner will have someone on the property, which should decrease problems with trespass-

ing, theft, vandalism and fire. This option is particularly appealing for absentee landowners. One limitation to long-term leasing is that not all ponds are large enough, or have suitable fisheries, locations or aesthetics.

## Day leasing

An aesthetically pleasing pond or one that offers good fishing tends to attract local anglers. Many anglers ask for the right to fish, while others trespass. Such an "attractive nuisance," often considered a liability, can be turned into a source of income. Instead of allowing free fishing, the owner can charge a nominal daily fee for fishing rights, hence the term "day leasing." Ponds of at least 1 acre, but often 5 to 10 acres, are most commonly day leased (Figure 2).

Most of these ponds are located close to a public road. Appropriate signs allow easy recognition by individuals travelling in the area. Angler harvest relies primarily on the natural production of the pond, including largemouth bass, bluegill, redear sunfish and crappie. However, channel catfish may be supplementally stocked to attract more anglers by increasing harvest.



Figure 2. Natural fish production provides most of the angler harvest at day leases.

There are many methods to monitor angler access. First, pond location should be close to the manager's residence to ensure that all anglers pay. The simplest way to collect fees is to have anglers place them into a specially constructed deposit box as they enter the property. This reduces the time expended in collecting fees and works well with small numbers of trustworthy local anglers. Another way to regulate access is to lock the entrance to the pond and require anglers to check in before gaining access. This may be inconvenient if it disrupts work or family life. Posting limited hours and even seasons of the year when the pond is open to fishing will relieve some of this inconvenience. A final method of keeping track of those who have paid is to allow open access to the pond. The manager then visits the pond on an occasional basis to collect the entrance fee. A dated receipt, ticket or permit is then given to those who pay. Later, the manager visits the pond and makes sure that each angler has a current ticket, collecting entrance fees from those that don't possess a current ticket. These operations are often referred to as "ticket lakes."

Operating costs for day-lease ponds are intermediate to those of long-term leases and fish-out ponds. Major costs are collecting the daily use fee and removing garbage. An aesthetically appealing pond helps attract anglers. Advertising can be as simple as by word of mouth. However, this method will generally restrict use to local anglers, and will likely result in only a modest income. Larger numbers of anglers can be drawn to such a pond by posting attractive signs along the roadside and by advertising in local newspapers.

Cost of fish is usually minimal if the natural production and harvest of fish is in balance. Supplemental stocking can increase catch rates and angler interest in returning, with cost varying with the quantity and cost of stocked fish. Returns from stocking can far out-

weigh costs. Additional costs, associated with proper pond management, include aquatic weed control, mowing of pond banks, fertilization, liming and supplemental feeding.

Daily fees generally range from \$2 to \$7 per day for adults for bass/panfish ponds, but can go as high as \$100 per day for ponds with quality bass fishing. There is frequently a limit on the number of fish that can be kept. Children are often admitted free or at half price. Senior citizens are sometimes given discounted fees.

One advantage of day leasing over long-term leasing is the lack of a long-term commitment, allowing the owner to be more flexible in the use of the pond. The day lease relies on natural fish production and requires minimal input of time and money; a distinct advantage over a fish-out operation. A day lease operator could also simply charge for access with no management. A disadvantage of day leasing is that it requires more of the pond owner's time than is required in long-term leasing. Time must be spent collecting litter and fees.

## Fish-out ponds

Fish-out ponds, also known as "pound lakes" or "pay-by-the-pond ponds" involve the highest level of management, the highest costs, and potentially the highest returns. Fish-out ponds are marketing as opposed to production operations. Fish-out ponds are especially appealing to families with children (Figure 3) and novice anglers, because of the increased probability of catching fish. They can be excellent places to learn to fish and also to purchase guaranteed fresh fish.

Catchable-size fish are stocked at densities well above natural production limits. Currently, the most commonly used species in southeastern fish-out ponds are channel catfish and rainbow trout. Other species are difficult to consistently obtain in abundance or to haul, hold or stock. A minimal entrance fee is usually charged. An additional charge is then paid for any fish that are caught, based on their number, weight or length. Another method is to charge a fee for entry with a catch limit on numbers or weight of fish.

Fish-out operations should have a minimum of two ponds, allowing anglers to select where they fish. Having more than one pond



Figure 3. Children like to fish at fish-out ponds because of the high likelihood of catching fish.

allows fishing to continue should problems occur in a pond. Ponds of a variety of shapes and sizes will give anglers the feeling of a natural setting. Half-acre ponds will accommodate a fairly large number of anglers who will be able to “reach” most of the fish, but not so large that the ponds can’t be easily seined.

One problem with catfish is that all of them are not caught before fishing success drops off.

Typically, catch rates may be as high as 8 to 10 fish per angler hour for the first two weeks after stocking, dropping to 1 to 2 fish per angler hour after the first few weeks. These “hook-shy” fish can be seined from the ponds, placed into live tanks and sold live or sold as processed fish to individuals who don’t fish or to those who don’t catch enough fish to meet their needs.

Late spring through early fall (April through November) is the primary sales period for catfish. Sales as high as 4,000 pounds per week have been recorded during the spring at individual fish-out operations. Both anglers and fish slow down in the summer. Sales usually increase in the fall as temperatures cool. Fish-out operations are generally open on weekends. Some are open seven days a week. Daylight hours are most common; however, many remain open after dark, especially on weekends.

Shade, a picnic area, food and beverages, bait, tackle, rental equipment, ice and a fish cleaning service can be incorporated into the business. The best means of advertising are word of mouth and roadside signs. Prizes can be given to anglers who catch extremely large fish or tagged fish.

Costs for such an enterprise are highly variable. Major expenses will be for fish and for labor. Help must be on site during all hours of operation to rent equip-

ment, sell concessions, weigh fish and collect fees, keep the facilities litter free, and minimize poaching. Other costs include construction of office, concession and toilet facilities, fencing or natural barriers to keep trespassers out; fish feed; and monitoring and maintaining proper water quality.

Returns from a fish-out operation are limited primarily by the number of pounds of fish, concessions and services that can be sold.

Entry fees of \$1 or more per person are common. Fish prices vary from \$1 to over \$2 per pound live weight for catfish and over \$3 per pound for rainbow trout. Many operators indicate that they make more money from selling drinks, food, bait and tackle than from the fish sold.

A distinct advantage of fish-out operations is the possibility of using small ponds. Ponds can be located within city limits and at major highway intersections. Also, fishing success does not rely on natural production, but upon artificially maintained populations. The major disadvantage is that fish-out operators must make a tremendous commitment to public relations, marketing and

promoting, and must be sensitive to public needs and behavior. Such operations need to be near population centers and highly visible. A lot of time is required on the part of the manager, who must deal with “people problems” (Figure 4).

### Considering fee-fishing as a business

Fee-fishing allows pond owners to supply fishing opportunities to anglers while simultaneously using under-utilized resources as a source of income. Fee-fishing is both a form of entertainment and a source of fresh fish for the user.

### Market

Fee-fishing operations are good markets for fish producers. Production acreage in many states is small and geographically dispersed. Producers can sell their fish live to local fee-fishing operations. Thus, there is no need to build a processing facility, and many state health regulations can be avoided by selling live fish. Producers can often get a higher price per pound from fee-fishing operators than from processors.



Figure 4. Day lease and fish-out pond operators must be willing to deal with people.

## Licenses and permits

As with most aquaculture facilities, permits must be obtained for surface and ground water (wells) rights, surface water storage (pond and ditch construction), construction of buildings and to meet any additional county or municipal regulations. In addition, permits may be required to sell live fish, bait and concessions, and for construction of buildings. Employees involved in selling food and cleaning fish should obtain state health certificates.

Many states have special permits for the operation of fee-fishing facilities such as ticket lakes or fish-out ponds. These allow anglers to fish at the facility without having to purchase state fishing licenses.

## Liability

Customers are subject to injury, therefore liability insurance is highly recommended. Liability insurance is available from most specialty insurance agents. Costs vary, but are usually based on gross annual revenues. In addition, product liability insurance covers you if someone gets sick on the fish that they take home and cook. In the case of a long-term

lease, the cost of liability insurance is less and is usually paid by the lessee (Figure 5).

All reasonable steps should be taken to avoid negligence. Alcohol should be prohibited. Aeration equipment should be placed so that it can operate effectively, yet provide little inconvenience and potential danger. First aid and life saving equipment should be readily available. Swimming should not be allowed. Safe access for handicapped anglers should be provided.

## People management

Successful day leases and fish-out operations require as much people management as they do fish management. They require a commitment to public relations, marketing and promotion, and sensitivity to public desires and behavior. The attention span of many anglers is short. Many people fee fish because they are almost certain to catch fish. If they do not catch fish within 5 or 10 minutes, they begin to complain. Some operations charge low prices for their fish, provide little service and have few expenses. Customers bring their own equipment and take care of themselves. Many successful

operations often charge more per pound, but provide everything including tackle rental, employees to explain rules, instruction for new anglers, conversation while they fish, and employees to remove fish from their hooks and to clean and pack their catch on ice.

Operators must be able to get along with people, because that's half the business. If you don't like people, you have a losing battle on your hands, no matter how well you manage your fish. You must be polite and courteous, even under the most difficult situations. The biggest problem that some anglers will have is knowing when to stop catching fish, catching more than they have money to pay for, and discovering this upon trying to leave your facility.

## Conclusion

Fee-fishing facilities are rapidly increasing in number, but vary substantially in their success due to differences in location, facilities, services and management. Medium to large ponds with controlled access are best suited for long-term leasing, while small to medium ponds can be day-leased or used as fish-out ponds. If individuals do not want to take the time to deal with people, yet want to use their ponds as a source of revenue, then they would be best advised to lease on a long-term basis.

## Sources of information

For additional information on fee fishing and pond management, contact your local county Extension agent, state fisheries specialist, local USDA Soil Conservation Service office or the nearest office of your state Fish and Game Commission. Phone numbers for these agencies are listed in the government section of your phone book.



*Figure 5. Liability insurance must be provided at all fee-fishing operations in the event that someone is injured.*

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## Southern Regional Aquaculture Center



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# Fee-Fishing Ponds

## Management of Food Fish and Water Quality

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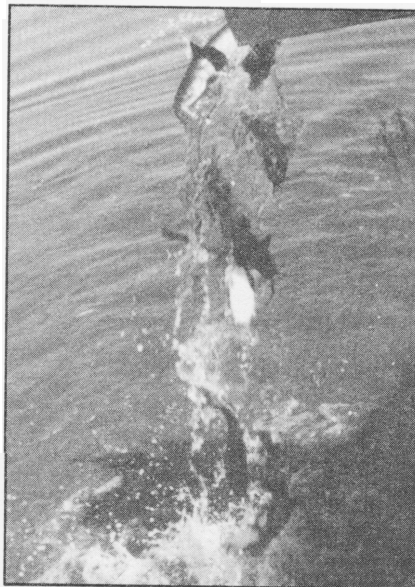
Fee-fishing operations, popular throughout the Southeast, can be a viable business opportunity that blends marketing, recreation and aquaculture. Articles often appear in the popular press about individual fee-fishing establishments, but few scientific studies have looked at their operation or management. Therefore, this fact sheet, and others in this series, rely heavily on personal observations and communications with fee-fishing operators and Extension specialists, and not strictly on scientific experimentation.

Proper management of fee-fishing ponds is extremely important not only to the health and matchability of the fish, but also to the corresponding economic success of the business. Many fee-fishing operators do not understand the basics of fisheries management, and therefore, suffer reduced profitability or financial losses. This publication suggests guidelines for management of the water and the fish to improve fish health, reduce fish mortality and increase angler catch rates, thereby increasing overall profitability of fee-fishing operations.

### Species selection

The initial management decision is to determine the type and source of fish to be stocked. Farm-raised

fish are superior to wild-caught fish because farm-raised fish are usually available in consistent quantities, are already conditioned to crowded pond environments and will consume formulated feeds. For sources of farm-raised fish contact your county Extension office, State Fisheries Extension Specialist, local Soil Conservation Service office, or state game and fish agency. The majority of fee-fishing operations in the Southeast stock farm-raised catfish or some combination of catfish with other warmwater species. It is best to remove existing fish populations



Loading, hauling and stocking is always stressful on fish.

from a pond when converting it into a food fish fee-fishing pond.

Farm-raised catfish are popular because of their availability, catchability, hardiness and desirability as a food fish. There are several kinds or species of catfish including channel, blue, white, flathead, hybrid catfish and bullheads. Channel catfish are the predominant farm-raised species and are, therefore, the most readily available and most commonly-stocked species. Farm-raised blue catfish, white catfish and channel x blue catfish hybrids, where available, are also good for stocking into fee-fishing ponds. Flathead catfish and bullheads are seldom farm-raised and are generally undesirable for stocking into fee-fishing ponds. Bullheads can rapidly overpopulate a pond, while flatheads become large predators on other fish in the pond.

Fee-fishing operations in areas with a coldwater source (i.e., mountain streams or large springs) stock rainbow trout. The biggest problem with trout is local availability. Farm-raised rainbow trout are available in several southeastern states, predominantly North Carolina, but also Georgia, Kentucky, Tennessee, Virginia, West Virginia, Arkansas and Missouri. A few fee-fishing operations stock rainbow trout only in the

winter. Winter stocking of rainbow trout allows the fee-fishing establishment to operate when catfish are no longer actively biting. Rainbow trout do well under static pond conditions when water temperatures are below 65°F.

Rainbow trout should not be stocked until pond temperatures are consistently below this temperature. If rainbow trout are stocked on top of existing catfish populations, anglers will catch few catfish because of the aggressive feeding behavior of the trout and because catfish feed less actively when water temperature is low. Rainbow trout need to be removed before the water warms to 70°F in the spring or they will die. Unless otherwise stated, the following information details the use of warmwater species, e.g., channel catfish.

## Hauling and stocking

The handling and water quality changes, caused by seining, loading, hauling and stocking, stress fish. Most fee-fishing operators do not produce their own fish and have little control over the seining, loading and hauling of fish they purchase. Operators should work with reputable producers and live-haulers that are experienced in providing fish to fee-fishing operations. Operators should purchase fish that have been denied feed for at least 1 to 2 days prior to transport during warm weather or 3 to 4 days prior to transport during

cold weather. For more information on live-hauling procedures see SRAC Publication Numbers 390, 391, 392 and 393, on Transportation of Warmwater Fish.

Reducing stress during unloading and stocking is one key step to successful fee-fishing management. Fish should also be observed for signs of low dissolved oxygen stress, parasites and diseases. Signs of low dissolved oxygen can include:

- dead fish,
- fish gasping at the surface, and
- pale skin/gill coloration.

Signs of parasites and diseases can include:

- skin or fin sores and discolorations,
- erratic swimming,
- staying or gasping at the surface, and
- discolored or eroded gills.

Observe the fish in the hauling tank. Remove a few fish from the tank (particularly any that look or act unnatural) and check them closely. Look at the gills. If gills of several fish are pale, eroded or bloody, the fish are probably either sick or highly stressed. If signs of disease are visible, fish should be treated in the hauling tank or placed into a holding tank or small pond where they can be isolated from other fish and

treated (see SRAC Publication Number 410, *Calculating Treatments for Ponds and Tanks*).

As many as 3 to 5 percent of transported fish will commonly die within a few days from hauling and stocking stress. Higher losses are indicative of fish that were already diseased or were hauled and handled poorly. Prior agreement of acceptable fish mortality rates and compensation for dead fish should be made before any fish are ordered from the supplier. Discuss mortality problems with the fish producer or live-hauler and work together to reduce future losses.

When purchasing live fish, the concept of "caveat emptor" (buyer beware) cannot be over-stressed. It is important for the operator to establish the point at which the fish become his/her property. Generally, the health of the fish is the responsibility of the producer or live-hauler until they are stocked into the fee-fishing pond. Determine if the producer/ live-hauler will stand behind his/her product in the event of a major fish loss that occurs within a few days of stocking and can be attributed to a verifiable disease.

Fish should be acclimated or conditioned to the pond water before being placed into the pond. It is a good idea to exchange water between the pond and the hauling tank prior to stocking. A slow exchange of water acclimates or tempers the fish to the new water conditions. Check the temperature and pH of both the pond and the hauling tank water. Most fish can generally tolerate a sudden change in temperature of up to 5°F and in pH of up to 2 units. Some water exchange/ adjustment period is beneficial even if the hauling tank water and pond water are very close to the same temperature and pH. A good rule-of-thumb is to temper fish at least 20 minutes for each 10°F difference in water temperature and/or for each unit of pH difference. Tempering is more important when moving fish from cold hauling water into warm



Routine oxygen testing is an important management tool.

pond water (e.g., in summer) and when moving fish from hard or brackish water into soft fresh water. Always watch the fish closely during the tempering process and keep the hauling tank well aerated.

### Stocking density and frequency

Stocking densities for fee-fishing ponds can vary from 1,000 to 10,000 pounds or more of fish per surface acre. Usually, fee-fishing operations which charge a single entrance fee ("ticket-lakes") in an all-you-can-catch system are stocked at 1,000 to 2,500 pounds of fish per acre. Operations that charge by the weight of fish that are caught ("fishout" or "by-the-pound" ponds) are usually stocked at higher densities under the assumption that more fish in the pond will result in higher catch rates. Most "fishout" ponds are stocked at 4,000 to 6,000 pounds of fish per acre.

However, recent research results with channel catfish at the University of Georgia suggest that angler catch rates are not related to pond stocking density. Catch rates were not significantly different in fee-fishing ponds initially stocked at 2,000 or 4,000 pounds of channel catfish per acre. Catch rates did not decline as densities declined. Regardless of stocking density, catch rates were high (8 to 10 fish per angler hour) when ponds were initially opened for fishing and declined to an average of 1 to 2 fish per angler hour after a few weeks of fishing.

Fish tend to be shy and elusive creatures. Healthy fish, when first stocked into ponds, tend to swim around the pond as though they are adjusting or orienting themselves. This behavior continues for several days, during which time the fish are easily caught, and fishing success is usually high. After this period, the fish that remain tend to move around less, possibly establishing territories, and are more difficult to catch. These fish

are referred to as being "hook-shy". Many experienced fee-fishing operators believe that fishing success is increased when small to moderate amounts of fish are stocked frequently, rather than stocking large numbers of fish at less frequent intervals.

### Managing fish inventory

"Hook-shy" fish are not easily caught and tend to accumulate in the pond, reducing the remaining carrying capacity of the pond and fishing success. Good recordkeeping on the weight of fish removed will suggest how many fish can be restocked without over-loading the pond, and will give a fairly accurate account of the weight of "hook-shy" fish remaining in the pond. As many as 30 to 40 percent of the fish in a pond can be unmatchable or "hook-shy."



**"Hook-shy" fish can be seined from ponds and held in live wells for sale to customers.**

Many operators fish a pond until few fish are being caught, then either drain or seine the pond to remove the remaining fish. These fish can then be restocked into other ponds or sold as live or processed fish. Ideally, in an intensively-managed operation, non-biters are removed regularly and offered for sale either as live or processed fish, and the ponds restocked with new fish. Several fee-fishing operators have reported some success in moving "hook-shy" fish to other fee-fishing ponds. Moving these fish to other ponds seems to reduce their "shy-

ness," at least for a short period of time. Even ponds that can be seined should be drained every three or four years to remove unseizable fish.

### Feeding

Fish in fee-fishing ponds should be fed. Research has shown that a complete feed of at least 26 percent protein should be used. Feeding helps to keep fish healthy and prevents substantial weight loss. Many operators like to feed as much as possible and still maintain good water quality. At high stocking densities, this will not be much more than a maintenance diet or ration.

A maintenance ration will keep the fish healthy, but still hungry, so they will continue to bite. A maintenance ration is around 1/2 to 1 percent of the body weight of the fish. Feed the maintenance ration every day or at least three times per week when water temperatures mandate feeding. Table 1 gives an estimated maintenance ration for feeding 1,000 pounds of fish. If good inventory records are kept, then maintenance feeding rates can be accurately calculated. If records are not available, an effort should still be made to provide a maintenance level of feed to the fish.

Winter feeding is also important. Fish that are not fed throughout the winter will lose weight and have higher disease and mortality rates. Most diseases and resulting fish losses will not appear until the water warms in the spring and may be due to the consequence of not following a winter feeding schedule. With proper winter feeding, fish will usually grow 5 to 25 percent, are healthier and start biting earlier in the spring. Table 2 gives a practical winter feeding schedule for catfish.

Feed age and storage conditions are also important as vitamin and mineral quality of feed deteriorates with time. This deterioration is accelerated by high temperatures and moisture. Store feed in a



Water Temperature °F	% of Total Fish Weight to Feed	Pounds of Feed per 1,000 Pounds of Fish
<b>Warmwater fish</b>		
70-75	0.5	5
76-89	1.0	10
above 89	0.5	5
<b>Coldwater fish</b>		
45-55	0.5	5
56-60	0.7	7
61-65	1.0	10
above 65	0.5	5

Temperature °F	% of Total Fish Weight to Feed	Feeding Frequency
45-50	0.5	once/week
51-55	1.0	twice/week
56-60	1.0	every other day
61-65	1.5	every other day
66-70	2.1	every other day

cool, dry place. **Never** use feed that is moldy, clumped or discolored. Note the date the feed was manufactured and never use feed that is 90 days past its production date.

### Water quality

Good quality water is essential in any successful aquaculture venture. In the case of fee-fishing operations, water quality management must include not only the water in the pond(s), but the change in water quality from the hauling system to the pond. Since ponds can have different water quality, each one must be observed, tested and managed individually. Fee-fishing operators should seek additional information on water quality from their county Extension office or State Fisheries Extension Specialist, and refer to SRAC water quality videos (*Water Quality Dynamics, Introduction to Water Quality Testing and Procedures for Water Quality Management*).

Water quality management factors to be considered in fee-fishing pond(s) include: dissolved oxygen, pH, alkalinity, ammonia and nitrite. Chemical test kits or meters are available commercially to test these water quality components. It is highly recommended that fee-fishing operations have these kits or meters to assess water quality on a regular basis.

### Oxygen

Once healthy fish are stocked into a fee-fishing-pond, the most important water quality factor is dissolved oxygen. Low dissolved oxy-

gen stress is fairly common in fee-fishing ponds and is a common cause of many disease outbreaks.

All living things consume oxygen in the process of respiration. In the pond, fish, insects, worms, bacteria and plants (at night) consume oxygen.

Oxygen dissolves into water, thus, the term “dissolved oxygen.” Oxygen dissolves into static ponds by diffusion from the air and from aquatic plants. Unfortunately, oxygen is not very soluble in water. So little oxygen dissolves in water that it must be measured in parts per million (ppm) or milligrams per liter (mg/L). The atmosphere contains about 20 percent oxygen or 200,000 ppm, yet pond water seldom contains as much as 20 mg/L. The amount of oxygen that will dissolve in water depends on the temperature and salinity of the water and the barometric pressure. If pure water is allowed to sit undisturbed, oxygen will diffuse into it until no more will dissolve at that temperature, salinity and pressure. This is called the saturation point (Table 3). Note that as water temperatures increase, the oxygen saturation level decreases. Therefore, low dissolved oxygen problems are more common in warm weather.

Ponds can become supersaturated with dissolved oxygen through the action of aquatic plants. Microscopic aquatic plants, called algae, produce most of the oxygen in ponds through the process of photosynthesis, which occurs during the daylight hours. Production of

°C	°F	D.O. mg/L (ppm)	°C	°F	D.O. mg/L (ppm)
10	50.0	10.92	24	75.2	8.25
12	53.6	10.43	26	78.8	7.99
14	57.2	9.98	28	82.4	7.75
16	60.8	9.56	30	86.0	7.53
18	64.4	9.18	32	89.6	7.32
20	68.0	8.84	34	93.2	7.13
22	71.6	8.53	36	96.8	6.95

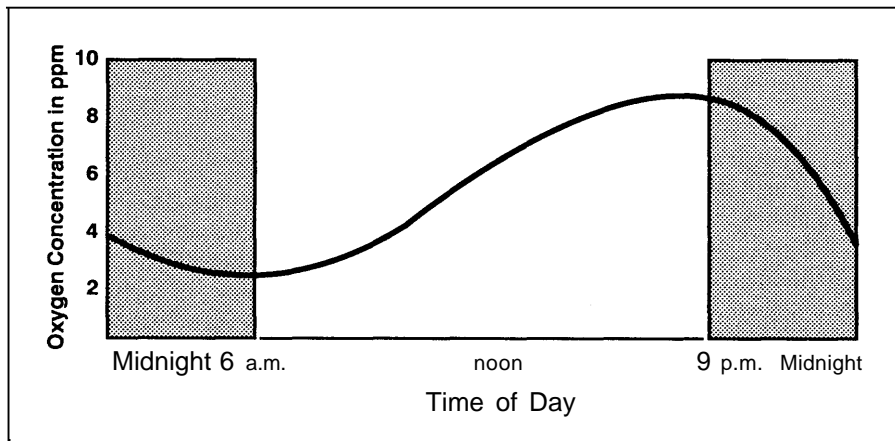


Figure 1. Typical daily oxygen cycle in warmwater ponds.

excess oxygen in the daytime, followed by high consumption of oxygen at night (i.e., respiration), causes oxygen concentrations to cycle up and down daily (Figure 1). Lowest oxygen concentrations typically occur near sunrise.

Fortunately, under normal circumstances more oxygen is produced by plants via photosynthesis than is consumed through respiration by all plant and animal life in the pond. Problems appear when dissolved oxygen concentrations drop below critical levels in the pond. In many trout, catfish and even carp ponds, with substantial water inflow, the primary source of oxygen is the dissolved oxygen in the inflowing water.

Dissolved oxygen below 4 mg/L generally causes stress to warmwater fish. This stress reduces the fish's feeding behavior and lowers resistance to disease. Coldwater fish generally start to stress at dissolved oxygen concentrations below 6 mg/L. Dissolved oxygen should be checked whenever a problem is believed to exist, such as when pond water changes color or when fish show signs of stress.

Dissolved oxygen can be checked either with a chemical test kit or an electronic oxygen meter. Chemical tests are inexpensive, but are tedious and take as long as 20 minutes to conduct. Chemical tests can be used if only two or three ponds are to be checked. Electronic oxygen meters are relatively expensive, but are a must if ponds

need to be checked frequently because of high fish densities or if several ponds must be managed at the same time.

Oxygen depletions can occur because of high respiration rates, rapid dilution of oxygen (during pond turnover), and/or chemical depletion of dissolved oxygen. High respiration rates can occur when fish are stocked at too high a density, an algae bloom becomes too dense, or high bacterial decomposition rates exist. From a practical management standpoint, this means that fish should not be overstocked in the pond. Fish densities in some existing intensively managed fee-fishing ponds do exceed 10,000 pounds per acre, in warmwater ponds with some nightly aeration, but no continuous water exchange. But the maximum density normally should not exceed 6,000 pounds per surface acre.

Algae blooms turn the pond water various shades of green, greenish-blue or greenish-brown. If algae blooms become too dense (e.g., "pea-soup" green), they can cause oxygen depletions at night during overcast weather conditions, or as they die. Algae blooms increase in density in response to increased nutrients from fertilization and feeding. Most fee-fishing ponds should not be fertilized if the fish are fed. If feeding alone does not sustain an algae bloom, then check the alkalinity of the pond. If alkalinity is above 20 mg/L, then the pond could be lightly fertilized in

early spring to develop a bloom. **Be careful, do not overfertilize!**

A summer pond "turnover" can cause an oxygen depletion. Turnovers are caused by cold winds and/or intense, cold rains which break up temperature stratification (layers) in deep ponds. The deep, cooler layers of the pond are usually devoid of oxygen. After the upper water layer (with oxygen) mixes with the deeper water layer (no oxygen) during a turnover, the pond may have critically low dissolved oxygen concentrations. Pond destratifiers, mechanical devices which keep the pond well mixed, have been used to prevent stratification and, therefore, turnovers. Aeration and/or flushing with well-oxygenated water are the only management options available after a turnover has occurred. In ponds with substantial outflow, an inverted standpipe drain system can help prevent stratification and, therefore, oxygen depletion from turnover.

Algae blooms should be carefully watched and dissolved oxygen concentrations checked when blooms become dense or pond color changes. When algae blooms die, the water changes color (usually becomes dark brown) quickly. Ponds should be aerated if dissolved oxygen drops below 3 mg/L. Continue to aerate until dissolved oxygen concentrations remain above recommended levels for the fish species that are present. Dissolved oxygen should be checked whenever the pond changes color, when fish stop biting or feeding, or when fish are observed near the surface. Dissolved oxygen should be checked routinely in the morning and evening.

## pH

Hydrogen ions (acidity) in solution are measured in pH units. A pH of 7 is neutral, below 7 is acidic and above 7 is basic or alkaline. Ponds with algae blooms will experience daily swings of one half to two pH units or more depending on the density of the algae bloom and the alkalinity of the

pond. Fish generally do well when pH is between 6.0 and 9.5. A rapid pH change of 2 units (e.g., 7 to 9) or more in a short period of time is stressful to fish. Also, ammonia toxicity is affected by water pH. The daily fluctuations in pH can be reduced or buffered by the addition of alkaline ions.

### Alkalinity

Alkalinity is a measure (in mg/L) of the total concentration of bases in water. Bases in pond water are mostly carbonate and bicarbonate ions. These bases react with hydrogen ions to slow or buffer pH changes. The higher the total alkalinity, the less pH generally fluctuates (see SRAC Publication Number 464, *Interactions of pH, Carbon Dioxide, Alkalinity and Hardness in Fish Ponds*). An alkalinity of at least 20 mg/L is needed to promote algae blooms.

Alkalinity can be increased in ponds by the addition of agricultural lime. A soil test of pond mud is the most accurate method to determine how much lime is needed. Pond mud can be tested by the Soil Testing Lab associated with your county Extension office. Contact your county Extension office for information on the proper methods of taking and preparing pond mud samples. In the absence of mud samples, water samples should be analyzed.

### Ammonia

Ammonia is the principal waste product of fish and is released during bacterial decay. Ammonia dissolves in water into two compounds: ionized and un-ionized ammonia. Un-ionized ammonia is very toxic to fish. The proportion of ionized to un-ionized ammonia in solution depends on the pH and temperature of the solution (see SRAC Publication Number 463, *Ammonia in Fish Ponds*). As temperature and pH increase, the percentage of un-ionized ammonia increases. At high temperatures and pH, total ammonia concentrations of 2 or 3 mg/L can be very stressful or deadly to fish. Fish exposed

to high ammonia concentrations will not feed and will become more susceptible to disease.

Ammonia seldom becomes a problem in fee-fishing ponds. High ammonia concentrations can, however, occur if a pond has been overstocked or overfed, or after an algae die-off. Check ammonia levels after algae die-offs or whenever the fish stop biting (or feeding). If high ammonia concentrations occur, stop feeding the fish and flush the pond with fresh water if possible.

### Nitrite

Ammonia is converted into nitrite which is also toxic to fish (see SRAC Publication Number 462, *Nitrite in Fish Ponds*). Nitrite as low as 0.5 mg/L causes severe stress in fish. Nitrite can become a problem and should be checked after a fall turnover, in deep ponds, or after a high ammonia episode. At these times, nitrite levels often reach 3 to 5 mg/L.

Nitrite toxicity can be controlled through the addition of chloride (salt). Forty-five pounds of salt per acre-foot of pond water will bring the chloride concentration to 10 mg/L. Ten parts per million chloride will counteract 3 1/3 of a mg/L nitrite. If salt cannot be added to the pond, then stop feeding the fish, flush the pond with fresh water and try to reestablish or maintain the algae bloom.

After any episode of low dissolved oxygen, high ammonia or nitrite, the fish should be watched closely for disease outbreaks. Usually diseases will start to appear within three to ten days after a water quality problem.

### Aeration

Aeration will seldom be needed at stocking rates below 1,500 pounds per surface acre and feeding rates below 10 pounds per acre per day. Aeration may be needed periodically if higher stocking or feeding rates are employed, or under certain weather conditions (hot, windless, cloudy summer days).

Many types of mechanical aerators are commercially available. Aerators can be powered electrically, by diesel or gasoline engines, or from the power-take-off of a tractor. Paddlewheel aerators are very efficient, but are expensive to purchase and are not usually manufactured in low horsepowers for small ponds (i.e., less than 3 acres). As a general rule, about one to one-and-one-half horsepower of electric paddlewheel aeration is sufficient to aerate one surface acre of pond. Other aerator designs may need additional horsepower, but many are available in small sizes which adapt well to small fee-fishing ponds. For help in choosing a good aerator for specific ponds, contact your county Extension office or State Fisheries Extension Specialist.

### Off-flavor

Off-flavor is caused by certain algae, fungi and bacteria which most commonly develop in summer and fall in nutrient-rich ponds. Ponds that develop scums (paint-like films or droplets) and those that give off strong odors often contain off-flavor fish. Off-flavor can occur in fee-fishing ponds if they develop dense algae blooms from over-fertilization or over-feeding. Many times fish purchased from producers are off-flavor when purchased. In fact, some producers attempt to sell off-flavor fish to fee-fishing establishments when they cannot sell them to processing plants. Not all customers will notice off-flavor (since it is common in wild fish), but many will be dissatisfied by off-flavor fish and may not return as customers.

Always ask producers or live-haulers if the fish are on-flavor. In many cases producers will discount off-flavor fish. Take one to three fish from the hauling tank and check them for off-flavor (see SRAC Publication Number 431, *Testing Flavor Quality of Preharvest Channel Catfish*). If off-flavor is present, it maybe possible to isolate these fish in a separate pond for a

few days (usually 7 to 21 days) until they are purged of the off-flavor. If isolation is not possible and if your customers dislike off-flavor fish, then reject the load of fish.

## Weed control

Fee-fishing ponds experience aquatic weed problems like all other ponds. Aquatic herbicides can be used to control aquatic vegetation (see SRAC Publication Numbers 360 and 361, *Aquatic Weed Management*). If you intend to use a herbicide read the label carefully. Most aquatic herbicides have restrictions on fishing and water use after treatment. If the fee-fishing establishment has several ponds for fishing, then herbicide treatment can be rotated (along with fishing) from pond to pond without great inconvenience to the customers. Herbicide use may temporarily restrict fishing in a single-pond establishment, however. In addition, the control of algae or vascular plants may cause dissolved oxygen depletions; be aware of the consequences before treating.

An alternative in many southeastern states is to stock grass carp (white amur). Grass carp stocked at 5 to 20 fish per acre will control most aquatic weed problems that would directly affect fee-fishing operations. Many states require the use of sterile triploid grass carp. Check state regulations and stocking recommendations with your county Extension office or State Fisheries Extension Specialist, Soil Conservation Service office or state fish and game agency before stocking grass carp.

One problem with using grass carp in fee-fishing ponds is that they readily take many popular catfish baits, but often break off because of their large size and great strength. This can result in their injury and death. Anglers must be told to release any grass carp they catch, or their value for vegetation control will be lost. Grass carp are edible, so the fee-fishing operator could allow anglers to keep these fish, paying for them by the

pound as they do for other fish. The grass carp would then have to be replaced with new fish. Check with your county Extension office or State Fisheries Extension Specialist, Soil Conservation Service office or state fish and game agency on the legality of selling grass carp for food.

## Fish health management

Fish diseases/parasites are always present in the pond environment. Fish are susceptible to these diseases when they become stressed or their resistance is lowered by poor water quality, handling, or nutritional problems (see SRAC Publication Number 474, *The Role of Stress in Fish Disease*). Signs of stress or disease include:

- not feeding (or biting),
- swimming erratically or flashing,
- acting highly excitable or irritable,
- swimming at the surface or lying in shallow water,
- not swimming away rapidly when disturbed, and/or
- having visible sores or discolorations.

If these signs appear, collect a fish or several fish and look for: open sores; eroded areas on fins, skin, mouth, or gills; pale or swollen gills; excessive slime on skin or gills; protruding eyes; and swollen or sunken bellies. Do not collect fish by hook-and-line; healthy fish bite, sick fish don't! If any of these symptoms appear, take or send the fish to a fish diagnostic lab as quickly as possible. Check with your county Extension office or State Fisheries Extension Specialist for the location of the nearest fish disease diagnostic lab and proper shipping procedures to follow for sending samples (see SRAC Publication Number 472, *Submitting a Sample for Fish Kill Investigation*). **Do not wait!** Diseases spread rapidly and treatments need to begin as soon as possible. Disease outbreaks will often occur after fish

are stocked, especially if captured wild fish are purchased.

A final word of caution about diseases. Many diseases have similar symptoms. Do not assume that because fish show the same symptoms as a previous disease that it is the same disease. Treatments change with the specific disease. An incorrect treatment may cause higher fish losses than doing nothing at all. Always get a diagnosis by a qualified fish disease specialist before starting treatment.

## Other considerations

Managing a fee-fishing operation is a complex undertaking. The above discussions have attempted to explain management of the water and the fish. People management is still the key to running a successful fee-fishing operation. This section will discuss management considerations concerning the regulation of fishing through rules related to tackle requirements, fish releases and bait restrictions.

Fishing tackle should be strong enough to catch the fish that are stocked. Light tackle and line will result in many fish being lost by anglers. Fish can be injured and may later die, or they may not feed again until healed. They often become "hook-shy." Set minimum line or tackle requirements that will reduce the loss of fish (or be the sole source of suitable tackle). Most fee-fishing operations have a "no release" requirement. Escaped or released fish severely reduce profitability in fee-fishing operations which charge by the pound. All fish must be kept and not released for the same reasons as outlined above. One notable exception is a fee-fishing operation connected to a restaurant which charges youngsters a fishing fee, then allows them to catch unlimited numbers of fish; however, all fish must be taken to the restaurant where they are cleaned and served to customers.

Most fee-fishing operations restrict the use of live fish (e.g., shad, gold-

en shiners and sunfish) as bait in order to prevent their escape and establishment in the ponds. These bait species can rapidly overpopulate the pond and may introduce new disease organisms. Live bait should be restricted to non-fish species such as worms, crickets and crawfish. Many fee-fishing operations restrict live bait to only that which it sells and do not allow live bait to be brought in by the customer.

### Recordkeeping

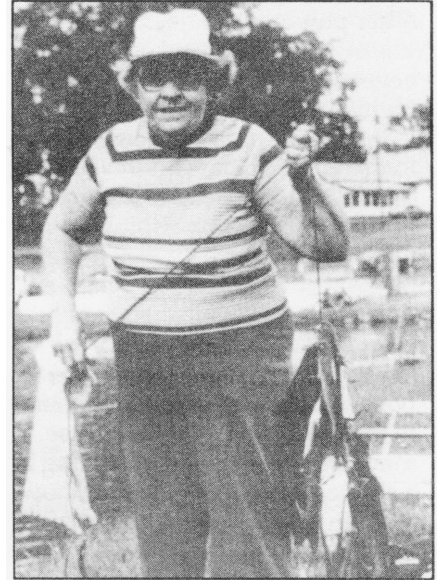
Fee-fishing is a business, and like any good business operation it requires good recordkeeping. Managers of fee-fishing operations should keep records on numbers and weight of fish stocked and on those removed by anglers or found dead in the ponds. Accurate records will help the manager make better decisions on when to restock with new fish, when to seine to remove "hook-shy" fish, and how much to feed to maintain healthy fish. Many fee-fishing operations that do not charge by the

pound still require that all fish be weighed before the customer leaves the premises. Records of water quality (dissolved oxygen, ammonia, etc.) will help managers monitor trends and help identify stressors when disease outbreaks occur. Keep good records, and many management decisions will be clearer and less costly.

### Conclusion

This fact sheet has dealt with the management of fish and water quality in food-fish type, fee-fishing ponds. Many of the same water quality considerations discussed, however, would be applicable to the management of large-mouth bass-bluegill ponds which are leased for fishing. Of course, there is more to a successful fee-fishing operation than just the management of the fish and water. Fee-fishing operators have to consider location, physical layout, concessions and all the things that impact on their customers. In other words, people management is just as important to consider as fish

management. For information on these and other aspects of fee-fishing please refer to SRAC Publication Numbers 479 (*Fee-fishing: An Introduction*), 482 (*Fee-fishing: Location, Site Development and Costs*) and 481 (*Development and Management of Fishing Leases*).



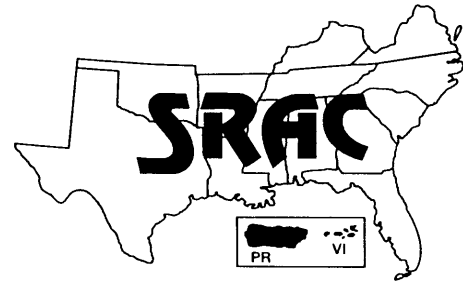
**People management is the key to running a successful fee-fishing operation.**

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June 1992

# Development and Management of Fishing Leases

Billy J. Higginbotham and Greg M. Clary\*

Leasing of hunting rights to generate income for landowners has become a common practice in most southern states. However, leasing of fishing rights generally has been limited to "fish-out ponds," where channel catfish, rainbow trout, or other species are stocked in specially designed (aquaculture) ponds. Other fee fishing systems include day and long-term leasing of ponds and reservoirs for sportfishing.

The popularity of fishing leases as farm or ranch enterprises has not kept pace with hunting leases generally because water resources held in the public domain have been more readily available compared to state and federal land for sporthunting. Nevertheless, a new trend involving fee fishing is slowly developing across the South. An increasing number of landowners who lease hunting rights are realizing that ponds and reservoirs on their property are valuable resources with the potential to generate additional profits.

Properties with sportfishing opportunities should be more valuable than lands leased for hunting alone, depending on the profitability of sportfish leases. A survey of Texas hunting leases reported that ponds were present on nearly one third of the ranches and that fishing was considered a popular recreational

activity on 18 percent of these leases. Results of a 1985 survey by the U.S. Fish and Wildlife Service indicated that while 16.7 million adult Americans hunted, over 2.5 times that number (46.6 million) went fishing.

Demand for opportunities to lease sportfishing rights is expected to increase as demand on public waters increases. It has been reported that demand for fishing is more than twice the demand for hunting among Texans. Furthermore, anglers reported that on average they would take almost twice as many trips as hunters. Anglers were willing to take five trips averaging 125 miles/ trip, while hunters were willing to take three trips at 250 miles/trip annually.

Sportfishing as an income-generating enterprise in combination with hunting leases recently has begun to interest some landowners. This is especially true on properties that are not capable of supporting hunting recreation because of limited tract size or urbanization. An increasing number of pond owners have realized that there is a demand for quality sportfishing opportunities. Much of the demand for leased fishing rights results from increased fishing pressure on public waters, decreased construction of new reservoirs, desire for exclusive fishing rights and reasonable expectations of catching fish.

The most important ingredient to successfully leasing private waters for sportfishing is proper management of fish populations. This ensures that they remain at levels capable of supporting reasonable harvest rates. The increased interest in catch and release fishing enhances the opportunities for more anglers to share the available fisheries resources. Catch and release also is consistent with anglers' desire for exclusive fishing rights and expectations of catching fish.

## Management

Major steps involved in sportfish leasing include locating lessees, establishing the terms of the lease and drawing up the lease agreement. Landowners offering fishing rights based on a management plan of "there's the gate and here's the key" will seldom be successful. Careful consideration of expected revenues and costs of starting a sportfish leasing program will provide reasonable expectations for profit. Landowners need to carefully plan their leasing enterprise to match available resources, demand for recreational experiences and profit expectations. For instance, sportfisheries emphasizing trophy size fish receive considerable publicity, yet anglers indicate trophy fishing ranks low as a motivation to go fishing.

Larger ponds and reservoirs offer more options for managing fish populations. For example, landowners with 10-acre reservoirs are

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in a more favorable position to manage exclusively for large-mouth bass than landowners with 1-acre ponds. Even though a market may exist for a target species such as largemouth bass, landowners might consider other species such as channel and blue catfish, sunfish, crappie and even rainbow trout. These alternative species may appeal to a broader range of anglers and may offer increased fishing opportunities.

Marketing is an important responsibility managers face in operating successful fishing leases, as it is for successful hunting leases. Landowners successfully leasing private waters for fishing will offer unique experiences at reasonable prices. These will not be readily available or accessible to the general public at public fishing areas. Careful evaluation of direct competition from other leasing operations, of alternate public fishing areas and of the number of potential lessees is necessary.

Lease fees received by landowners should be expected to pay the various expenses associated with establishing and operating lease enterprises in addition to acceptable returns for landowner labor and management. Investment costs may vary from onetime expenses such as pond construction or improvement to annual operating input costs including fertilizers, labor, chemicals and maintenance. Additional expenses may include security, liability insurance and a portion of the property's ad valorem taxes. Many landowners will be leasing fishing rights on existing ponds or lakes and will not be incurring actual costs involved in pond or reservoir construction.

Management strategies important to developing fisheries on private lands are:

1. Appropriate stocking rates and species balance;
2. Control of noxious aquatic vegetation; and
3. In some cases, fertilization to increase carrying capacity.

Other important operational activities include water quality maintenance, fish attractor construction and maintenance, and fish population surveys conducted by a professional biologist.

### **Value-added amenities**

In addition to basic input costs, additional service-related amenities often provided to clientele include boats and motors, fishing tackle, guide services, meals and lodging. These value-added items are often desired by anglers, but do increase the cost of the lease. Landowners establishing a profitable leasing enterprise must determine in advance how much potential customers are willing to pay for these value-added amenities. It is important to ensure that revenues exceed costs of establishment and operation for a profitable enterprise.

### **Economic analysis**

The potential profitability of investing in a sportfish lease enterprise should be evaluated prior to start-up in much the same way as any long-term investment with expected future returns. Net present value (NPV) analysis is an appropriate economic tool for estimating the profitability of establishing a sportfish leasing enterprise while accounting for the long-term nature of the investment.

The calculation of NPV is accomplished by deducting current investment requirements from future net earnings, expressed in terms of current dollars, generated by the investment. Expressing future net earnings in current dollars involves accounting for expected inflation and anticipated interest earnings foregone by not putting the same amount of money in an alternative investment. In other words, NPV accounts for the time value of money or the earning potential money has if placed in an interest paying account.

For example, the current value of a contract promising to pay \$100 after 5 years is \$68.05 (assuming money would earn a real rate of 8

percent interest in an alternative investment). On the other hand, a \$68.05 investment today at 8 percent (real rate compounded annually) interest would grow to \$100 at the end of five years. In other words, a person would be indifferent between having \$68.05 today and \$100 five years in the future with the opportunity to earn an 8 percent real rate of interest.

The discount (interest) rate used in estimating NPV is a reflection of several factors, including the landowner's expected return on this and other alternative investments, level of risk involved and prevailing inflation rate. It is appropriate to consider foregone opportunities as costs in economic evaluations and in establishing the rate at which future earnings are discounted to current values since other activities may be negatively impacted by the decision to lease part or all of the available fishing rights.

For example, a landowner facing the costs and revenues listed in Table 1 for an existing 10-acre pond receives more than the 8 percent real return on investment included in the NPV analysis, as indicated by the positive NPV estimate. Results in this example imply that as long as the annual lease fee is greater than \$902/yr, the landowner would reap greater benefit from the lease than from investing in an alternative with an 8 percent real rate of return. If the 10-acre lake were located on a 1,000-acre hunting lease, the annual lease fee for fishing rights might be included with the hunting lease by adding an additional amount per acre to the original hunting lease charge.

### **Marketing and promoting sportfish leases**

Outdoor recreation experiences consist of five parts: planning and anticipation, travel to activities, on-site activities, travel from activities and recollection of experiences. All of these elements are important to successfully marketing the fishing enterprise.

**Table 1. Example net present value (NPV) analysis of sportfish leasing on an existing 10-acre lake.<sup>1</sup>**

Item	Years				
	Start Up	1	2	3	4
Revenue-Lease Fees	\$1,250	\$1,250	\$1,250	\$1,250	\$1,250
Fingerlings	700				
Fertilizer	150	150	150	150	150
Lime	40				
Herbicide	200	200	200	200	200
Labor	250	250	— 250	250	250
Taxes	30	30	30	30	30
Insurance	100	100	-1 00	100	100
Net Income	(220)	520	520	520	520
NPV <sup>2</sup>	\$1,502				
Breakeven lease price <sup>3</sup>	\$ 902				

<sup>1</sup>Assumptions used in creating this example include: (1) lease fees collected at the start of each year to eliminate borrowing operating capital, (2) start-up costs are assumed to be on owner capital contribution, (3) operating costs are incurred at the beginning at each year, (4) NPV calculated using an 8 percent real rate of return and (5) lake contains fish populations but supplemental stocking of Florida bass and channel catfish fingerlings is planned.

<sup>2</sup>NPV=current value of future net incomes minus initial Start-up costs.

<sup>3</sup>Lease price at which NPV equals \$0.

Marketing consists of matching the products of an operation with the needs and desires of customers. However, marketing a recreational experience differs from marketing commodities such as crops, livestock and timber. Landowners interested in marketing sportfish recreation will be dealing with a “non-standard” commodity and will probably be dealing directly with customers (marketing retail).

If on-site lodging is available and the property is close to an urban area, landowners may want to employ a lease of limited duration, i.e., day, weekend or week. However, if landowners do not desire a high degree of contact with the public or cannot provide lodging, a season-long or year-round lease may be preferred. Each landowner must determine the marketing strategy that best suits the individual situation.

Many people mistakenly believe that marketing is just another word for advertising. Promotion can take on many forms, only one of which is advertising. Two effective ways to promote leasing ar-

rangements are personally explaining your leasing opportunities to anglers and providing testimonials by satisfied customers. Advertising techniques that have proven successful for hunting leases also apply to sportfish leases. Word of mouth, local news, natural resource agencies and chambers of commerce are primary sources of advertising for hunting and fishing lease information. Other successful advertising and publicity techniques include, but are not limited to, magazine articles, television, radio, sports shows, trade journal stories and direct mail-outs.

### Lease agreements

In order to prevent misunderstandings and clearly define the terms of a sportfishing lease, a written agreement should be developed by the lessor and signed by both parties (see example on page 4). With obvious modifications, many considerations included in hunting leases can be used as a basis for developing written sportfishing lease agreements. Deer lease agreements often include duration of the lease, description of the

lease tract, access, species available, hunting methods allowed, density of hunters, price, payment schedule, use of facilities, lease transferability and rights lease renewal.

Although it is possible to prepare a written sportfishing lease on your own, it is recommended that you consult your lawyer during the actual drafting of the document. Money paid for such services may well prevent potential legal problems. At least two copies of the lease should be prepared and properly signed – one copy for the landowner and the other for the lessee(s).

### Landowner liability

As with hunting leases, landowners must address the issue of liability whenever sportfishing rights are leased. Landowners leasing sportfishing rights should include a “hold harmless” clause in a written lease agreement that protects them from liability and makes lessees responsible for damage or accidents. Since “hold harmless” clauses are not infallible, landowners should consider



extending insurance coverage or requiring lessees to purchase liability insurance that covers both parties. Statutes regarding liability may also differ between states.

## Summary

Although the leasing of sportfishing opportunities is a relatively new enterprise compared to hunting leases, management and marketing concepts are similar. Landowners interested in marketing sportfishing recreation must wear two hats: the hat of a fisheries manager to maintain suitable fish populations and the hat of a successful business manager to maintain positive cash flows and profitability while working with clientele. Unfortunately, many individuals are accomplished and comfortable in one of these roles, but lack the skills or interest to be attentive to the other. The success of sport-fishing operators depends upon well thought out, detailed and written management and marketing plans. The intense competition that exists today for the public's recreation dollar almost ensures that those depending on blind luck will not succeed. The availability of quality fishing is an important component of a sport-fish recreation enterprise. However, it is only one part of the entire recreational experience.

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### Sample Fishing Lease

This lease made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, between \_\_\_\_\_, hereinafter called the "LANDOWNER," and \_\_\_\_\_ (the person or group to whom fishing rights are being leased), hereinafter called the "LESSEE."

#### WITNESSETH THAT:

1. LANDOWNER for and in consideration of the rents and covenants hereinafter referred to does hereby lease unto LESSEE for the purpose of fishing for (bass, catfish, bluegill) the following premises (describe the tract of land and/or pond to be leased).
2. The term of the lease will be for the period of one year, beginning on \_\_\_\_\_, 19\_\_\_\_, and ending on \_\_\_\_\_, 19\_\_\_\_.
3. LESSEE shall pay unto LANDOWNER a rental of \$ \_\_\_\_\_ in cash, one-half of the total \_\_\_\_\_ paid or before \_\_\_\_\_, 19\_\_\_\_, and the balance to be paid on or before \_\_\_\_\_, 19\_\_\_\_.
4. LESSEE will abide by the state and Federal laws regarding quantity of catch (limit) and minimum size of fish, e.g., 12-inch minimum for bass fishing, and will report quantity and size of fish caught to the LANDOWNER so that records may be accurately kept.
5. LANDOWNER reserves the right and privilege for a maximum of (give number of people) persons from his family to fish on the leased property at any time.
6. LESSEE may permit guests to accompany him upon the leased property for the purpose of fishing for (bass, catfish, bluegill) but the number of guests the

LESSEE may invite upon the leased property shall not at any time exceed (number agreed upon).

7. LESSEE will not cut, injure, or destroy any trees, crops, roads, fences, buildings, or other improvements located on the leased property, and LESSEE agrees to compensate LANDOWNER for all damages so caused as determined by LANDOWNER. Vehicular travel is limited to established roads now located on leased property.

8. LESSEE will not assign this lease or sublet the leased property for any part thereof without the written consent of LANDOWNER.

9. LESSEE agrees to save harmless LANDOWNER against any and all claims of loss, damages, liabilities, or other expense of any nature, character, and kind that may arise out of, be connected with, or as a result of LESSEE'S occupancy and activities on the leased property.

10. If LESSEE defaults in the performance of any of the conditions or covenants hereof, then such breach shall cause an immediate termination of this lease and a forfeiture to LANDOWNER of all rentals prepaid.

11. LESSEE and his guests (may) (may not) camp overnight on the premises and (may) (may not) swim in the pond.

12. LANDOWNER agrees to maintain adequate weed control in and around the pond, and (describe any additional management practice that will be performed, e.g. periodic stocking with catfish, feeding of fish, etc., or any other facilities that will be provided for the lessee's use).

_____ LANDOWNER	_____ LESSEE
_____ WITNESS	_____ LESSEE (Space should be provided for each lessee to sign.)

From "Fee Fishing in Florida," Charles E. Cichra.

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# Fee Fishing

## Location, Site Development and Other Considerations

Charles E. Cichra, Michael P. Masser and Ronnie J. Gilbert\*

Important ingredients for a successful fee-fishing operation are: having a good location, knowing your clientele, providing good facilities and services, and operating like any profitable business.

The site must be carefully chosen, developed and promoted to attract a large group of anglers, and once there, for them to have a successful and enjoyable fishing experience. The staff must work with the customers to provide consistently good catches in a pleasant atmosphere. This fact sheet provides information which can be used as the basis for locating, developing and operating such a facility.

Additional information can be found in SRAC Publication



Numbers 480, *Fee-fishing Ponds: Management of Food Fish and Water Quality* and 483, *Fish-out Ponds: Economics*.

### Location

Most successful fee-fishing operations are located within 30 to 50 miles of population centers with 50,000 or more people. Proximity to popular fishing areas or other types of public attractions increases an operation's chance for success. Locating in a high-traffic area (major highway or intersection) increases the number of people who pass by and have a chance to see the operation.

Do not locate near an existing fee-fishing operation unless you are confident that there are enough customers to support more than one facility. The majority of anglers at urban fee-fishing establishments drive 15 miles or less, while anglers at rural fee-fishing operations commonly drive more than 15 miles.

Ponds should also be located in a "natural" setting screened from urban distractions, and have easy access and plenty of parking. Trees effectively screen roads, parking areas and buildings from the fishing area. Other considerations in selecting a site include having soils suitable for constructing ponds and having an adequate supply of high quality water. For more information, refer to SRAC Publication Numbers 100, 101 and 102 on site selection and construction of levee and watershed ponds.

\*Department of Fisheries and Aquaculture, University of Florida; Alabama Cooperative Extension Service, Auburn University; and Cooperative Extension Service, University of Georgia.

## Clientele

Fee fishing appeals to experienced anglers who simply like to fish but are limited by time or resources (e.g., owning a boat), families with small children, the physically handicapped, single parent families and the elderly. Fee fishing is attractive to tourists or individuals who only occasionally fish because in most states no license is required to fish in a fee-fishing pond.

Fee fishing provides the excitement and challenge of fishing with improved chances of catching fish. Fish-out ponds are especially appealing to families with children because of the ease of catching fish. They are an excellent place to take someone who is learning to fish.

Many patrons will have little fishing experience. Nationwide, most patrons are family groups (parents with children), groups of family members and friends, or individual men. Many customers will be retired or disabled. Repeat customers will represent a large proportion of the clientele.

The four leading reasons why people go fee fishing are:

- good fishing;
- as a family activity;
- abundance of amenities available; and
- it is a fun and safe activity.

## Advertising

Fee fishing must be planned as a business. Advertising can greatly enhance the probability of success. Many forms of advertising are used by fee-fishing operators, including word-of-mouth, roadside signs, newspaper advertisements, television and radio commercials, local shopper and visitor guides, bumper stickers, fliers, direct mail, and hats and clothing with imprinted advertising.

The most effective means of advertising are word-of-mouth and signs. Most customers come based on word-of-mouth, so be sure that customers are satisfied.

For every group of anglers which has a good fishing experience, as many as 8 to 10 additional groups will show up at an operation. It is a definite advantage for an operation to have been around for a while so that customers get to know the facility and its operators. Having a good relationship between the management and customers is important to ensure that people will refer others to the operation. Professionally-painted attractive signs, large enough to be easily seen and well located, are usually worth the expense. During the start-up period of a new operation, other forms of advertising can also be effective. Advertisements should include directions; facilities, services and activities available; schedule of operation; and fees.

## Permits

Permits must be obtained for surface and ground water (wells) rights, surface water storage (pond and ditch construction), construction of buildings and for meeting any additional county or municipal regulations. Permits may also be required to sell live fish, bait and concessions, and for construction and operation of restroom and fish cleaning facilities. Employees involved in selling food and cleaning fish should obtain state health certificates.

Many states also have special permits for the operation of fee-fishing facilities. These permits allow customers to fish without having to purchase state fishing licenses.

## Developing a successful fee-fishing operation

A fee-fishing operator should always keep in mind that, primarily, he/she is providing recreation, not just selling fish. To successfully provide quality recreation, the operator must pay close attention to facility design and security, pond construction, fishing success, concessions, daily operation, promotion, safety and aesthetics. A fee-fishing operation is a people-oriented business that requires

a person with the personality, motivation and resources to deal with the public. It is not that much different from operating a restaurant; people come for enjoyment and expect service.

## Facility design and security

Security and control of access must be kept in mind when designing a fee-fishing operation. Good security will increase customer safety and decrease vandalism, unwanted entrance during off hours and theft. In most cases, complete fencing of the pond area with only one entrance is recommended. Paths, fences, gates and landscaping should lead the customers from the parking area to the entrance, usually the concessions area, where entry and exit to the ponds can be supervised. This design ensures that entrance fees are collected. Entrance fees help to reduce loitering by individuals who do not intend to fish. As anglers leave the facility, fees can be collected for all fish that were caught, and coolers, pails and other storage containers can be inspected to reduce theft.

Concessions and restrooms should be located in the entrance and exit area. Sales of concessions can be increased by funneling traffic past concession areas. Restrooms should be located in sight of the cashier to allow for good supervision. Restrooms and other out-of-the-way places are a temptation for some customers to dispose of fish that they have caught and do not want to purchase.

Security lighting of more remote parts of the ponds will help keep out unwanted night-time intruders and provide a safer and more convenient fishing environment for late-night anglers. Lighting also allows extended hours of operation.

Since a fee-fishing business is often operated close to the owner's home so that the pond and concession areas can be closely watched, it is important to

make private areas off limits to customers. Areas open to fishing and associated activities should be clearly identified to protect the privacy of family members and neighbors.

Paths leading to the ponds will minimize the effects of heavy foot traffic. Special considerations must be taken in design and construction for physically-handicapped anglers. Often, inexpensive minor design modifications will greatly improve access for this group of anglers. **Keep safety in mind!**

### **Pond size and construction**

Every imaginable shape, size and construction technique have been used for fee-fishing ponds. The following are some important considerations that a prospective or expanding fee-fishing operator should consider when building or renovating ponds. Pond size and construction are important to the overall success of a fee-fishing operation.

Ponds should be constructed with:

- a good clay base and dam core
- smooth, even bottoms with no stumps or obstructions
- properly constructed drains
- proper bank, side and bottom slopes
- accessible banks
- levees that are wide enough to allow vehicular traffic for stocking, harvest by seining and routine maintenance
- emergency spillways

Ponds without a proper clay base or dam core will leak making it difficult to manage or maintain water levels. Ponds should be constructed with a drainage system through the dam and smooth bottoms sloping toward the drain without obstructions, so they can easily be seined and drained (see SRAC Publication Number 480 *(Fee-fishing Ponds: Management of Food Fish and Water Quality)*).

Rectangularly-shaped ponds allow a larger shoreline-to-water ratio than square ponds, thus providing more shoreline for fishing a given size pond. Irregularly-shaped ponds give people the feeling that they are fishing under a more or less natural setting; however, margins should not be so irregular that the pond cannot be effectively seined. Optimum pond depth is between 3 to 5 feet, except where icing is a problem. Those ponds should be 5 to 8 feet in depth. Fish do well at this depth and seining is simplified. Avoid pond areas with depths of less than 2 feet to reduce aquatic weed problems.

Pond banks need to be grassed or sodded and should be wide, relatively flat, but gently sloping toward the pond. This allows for easy access, room to accommodate the movement and comfort of customers, and quick drainage of water after rains. Ideally, ponds should be constructed with minimum slope of the banks down to the water so patrons can fish at the water's edge and land fish without problems. Finally, if the pond receives run-off during rainfall, it should have an emergency spillway. It may be necessary to build an escapement barrier across the emergency spillway to keep large fish from leaving the pond during heavy rains. For

assistance in pond construction contact your local USDA Soil Conservation Service Office.

Pond size is also important. Small ponds are better from a management and fishing success standpoint than large ponds. Ponds of one quarter to one acre in size can be readily managed. Ponds of this size can be quickly stocked to optimum levels, seined or treated for disease or to improve water quality, and can be intensively fished from the banks. Ponds larger than two acres generally do not allow complete fishing access unless they have been specifically designed with earthen jetties, piers or a highly convoluted shoreline (see "Utilizing existing ponds" section which follows).

Intensively managed fee-fishing operations should have multiple ponds. This enables the manager to better control fishing success and to isolate and treat diseases or other problems. If several ponds are available, the manager can move patrons to ponds where fish are actively biting, assuring successful and satisfied customers. Fish can be moved from one pond to another to increase densities and catchability. Also, fish of unknown condition (i.e., purchased off-farm) can be isolated in a separate pond away from other fish so there is no chance of disease transmission. If a single pond



*Concessions can increase profit potential.*

in a multiple pond fee-fishing enterprise develops a problem (e.g., disease), the manager can get the problem under control in that pond without having to close the entire operation.

## Water source

All ponds must have a water source. Sources could include rainfall, a reservoir, stream or well. Rainfall can be undependable; therefore, these ponds should have an alternative water source. Many fee-fishing operations have a reservoir that traps rainfall which is used to fill and maintain the fish-out ponds. The reservoir may also be fished. Ponds can be filled with water from a nearby stream, but first check on state laws that regulate use of public water. Surface water sources may introduce wild fish, parasites and diseases. The best water source is a well which produces good quality water. Wells should be sized to the pond acreage. For filling ponds, a well of at least 40 gallons per minute per acre of pond is needed. A well that produces 20 gallons per minute per acre of pond is sufficient to maintain water levels. Finally, always have well water checked for its quality before relying on it as a water source.

## Concessions

Concessions can be the most profitable segment of a fee-fishing enterprise. Concessions should be within easy access of the ponds, attractively maintained, and can include some or all of the following:

- bait
- fishing tackle
- food, snacks and drinks
- ice
- newspapers
- cookbooks, fish batter and seasonings
- hats and clothing
- first aid supplies

- rental equipment (rods, reels, chairs, umbrellas, etc.)
- live and dressed fish (fresh/frozen)
- fish cleaning services

Concessions should be viewed as not only a chance to make money, but also an opportunity to provide the customer with essential services. Many patrons will arrive having forgotten critical supplies; without a concession that carries these items, patrons will be forced to return home or leave to purchase the items elsewhere. A selection of bait (worms, crickets and stink-bait) and fishing tackle (hooks, line, sinkers, corks and lures) is most essential.

Many concessions also rent fishing equipment, chairs and giant umbrellas. Cane poles or spin casting gear are most commonly used. Deposits help discourage rental equipment vandalism and theft. Food is also common, ranging from drinks and snacks to complete meals. Sundries such as sunscreen, bandaids, aspirin and antiseptics should also be sold. Often, operations sell imprinted caps, sunglasses and T-shirts. These become walking advertisements for the establishment. A holding tank can provide live fish for individuals who do not fish, but want fresh fish for home consumption, and for anglers who want more fish than they were able to catch.

Adequate restroom facilities are necessary to insure the success of an operation. They must be kept clean. Consult with your County Health Department about appropriate regulations.

Finally, fish cleaning services are popular. Many anglers like to catch fish, but do not like to clean them and will pay for this service. Fee-fishing operations commonly charge \$0.25 to \$0.75 per pound to clean fish for the customer. Before starting a fish cleaning service, check with your County Health Department about sanitation standards for fish processing and

waste disposal. Dressed fish, fresh and/or frozen, are also commonly sold. Selling dressed fish means anyone can take fish home for dinner. Consider accepting food stamps.

Non-anglers can be provided with alternative activities and conveniences such as game rooms, playgrounds, picnic areas and camping facilities. Seriously consider the possible financial return on such investments and potential increased liability and maintenance cost before providing these facilities.

## Times of operation

For most of the southern United States, the primary fishing season runs from the middle of March through early November, with Memorial Day to Labor Day being the peak period. People have the urge to fish and fish are generally most willing to bite during this period. Sales as high as 4,000 pounds per week, most of which are sold on weekends, have been recorded at some operations. Both anglers and fish slow down in the heat of the summer. Southern states have an advantage over northern states in that catfish will often bite during the winter, especially if it is mild. Northern operations, however, can provide anglers with good fishing through much of the fall, winter and spring by stocking species such as rainbow trout which prefer cold water. Ice coverage can stop pond fishing, but aerators can keep ponds open and fishable.

Fish-out operations are generally open on weekends. Thursday through Sunday are peak days. Some operations are open seven days a week, 24 hours a day. Daylight hours are most common, with many operations remaining open after dark especially on weekends. A good plan is to start out slowly, being open only on weekends, and then to expand operating hours as business increases.



Regulations should be in obvious places.

## Signs

Signs should clearly direct customers to parking areas and from parking areas to the entrance of the pond area. At the entrance, signs should provide all information needed by potential customers including prices, fishing regulations, times of operation and activity rules. Prices for fish, fishing and fish cleaning, along with other services should be clearly displayed to avoid confusion and later misunderstandings. All rules should be posted. Swimming and the use of alcohol should be prohibited for liability reasons. All fish caught should be kept to prevent loss of fish due to

delayed hooking and handling mortality.

Other items that can or should be on the signs include:

- prohibiting the use of abusive language
- indicating which ponds are open for fishing
- indicating any fishing gear restrictions
- prohibiting snagging, minnow traps and live bait
- asking customers to report anyone breaking these rules

These rules, along with information on how to fish and business name, location and times of operation, can be included in a pamphlet that is given to all customers. Anglers can refer to this while fishing, and take it home as a form of advertising to later encourage them and others to return.

## Promotion

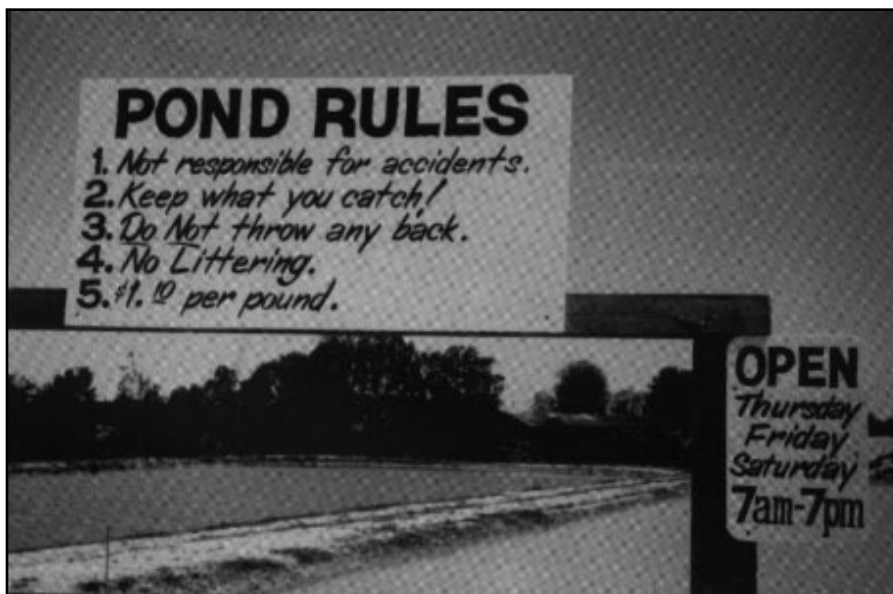
Night fishing and group rates, including free entrance fees, should be offered to the elderly, handicapped and youth groups such as those sponsored by churches, schools and scout organizations. You may want to award prizes for the largest fish, most fish or for catching a specially-marked fish when groups are fishing.

Some operations further promote their business with regular customers by tagging a few "trophy" fish and offering prizes to any angler that catches one. Posting instant photographs of customers with their catch, especially large fish or large numbers of fish, will bring people back to show their friends the photograph, and it will encourage other anglers to return. Your imagination is the limit when promoting your business.

## Safety and liability

Liability insurance is highly recommended because customers can be injured while on the property. Product liability insurance covers you if an individual gets sick eating fish that they take home. Insurance coverage is often required by the landowner, if different from the operator, and by your banker. Generally, the more people that you deal with, the higher your insurance rates. All reasonable steps should be taken to avoid negligence. Alcohol should not be allowed on the premises because of the many problems and questions of liability that it can cause.

Equipment must be placed so that it can operate effectively, yet provide little inconvenience and potential danger to customers. Electrical aerators also pose the problem of combining the hazards of electricity with that of water. First aid and life saving equipment should be readily available. All areas should be kept mowed to reduce habitat for snakes and other pests. Fire ant and wasp control programs should be maintained to reduce injuries due to



Limited entry times and well-publicized liability statements are good practices.

insect bites and make fishing more comfortable.

### **Aesthetics and comfort**

The area in and around the ponds should be aesthetically pleasing. The grounds should be well kept: grass mowed, banks maintained and litter removed. Covered trash containers should be readily available and frequently emptied. Provide benches and picnic tables in shaded areas for customers by planting fast-growing trees or constructing small shade pavilions or awnings. Good seating and shade will improve customer comfort and increase the length of their stay. Fee fishing is a people-oriented business; provide patrons with good fishing in a pleasing setting and they will be return customers.

### **Utilizing existing ponds**

Many existing ponds, while not ideal for fee fishing, can be successfully used. In fact, many fee-fishing operations in the Southeast use old hill ponds.

The problems with using existing hill ponds are generally associat-

ed with design. These ponds usually will not have proper access around the entire pond, many will be too large (usually greater than 2 acres) to be fished effectively, and most cannot be easily drained or seined. Ponds that cannot be completely fished, and those that cannot be drained or seined, accumulate large numbers of "hook-shy" or non-catchable fish (see SRAC Publication Number 480, *Fee-fishing Ponds: Management of Food Fish and Water Quality*). Thirty to fifty percent of the catfish in a pond can be "hook-shy." This accumulation of fish reduces fishing success and limits the number of additional fish that can be stocked into the pond. As fishing success drops, so will customer satisfaction.

Although access and fishing success can be a problem, larger hill ponds can be attractive because of their aesthetic beauty and the perception of a larger, less crowded environment. Overwhelming fishing success may not be the most important aspect of a customer's fishing trip. Some customers come to enjoy the experience of fishing and the beauty of uncrowded natural surroundings.

Many times large hill ponds are managed as "ticket lakes" rather than as "fish-out lakes." Fewer fish are stocked and most profit is derived from concessions. The entrance fee goes to purchase fish for restocking. Large hill ponds managed as ticket lakes can be profitable, particularly as supplemental income.

Remember, fee fishing is a recreation business. Success will be based on repeat customers and good word-of-mouth advertising. A repeat customer is one who caught fish and "had a good time." An attractive, well-managed pond with consistently good fishing and friendly service will keep customers coming back!

### **Additional sources of information**

Contact your county Extension office or State Fisheries Extension Specialist for more information on fee fishing in your state. Many states have Extension publications which deal specifically with the topic of fee fishing or with related topics such as pond construction, fish production, management of water quality and fish health.

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# Heritage Tourism





United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

AE-3

# Alternative Enterprises – Heritage Tourism

## How to use your land's legacy to benefit the public and boost your bottom line

### What Is Heritage Tourism?

Unlike conventional tourism, heritage tourism features historical sights and other cultural attractions that help people learn about our Nation's past. If properly planned and managed, land, buildings, and other resources that have historic or cultural significance – or that are located near historically or culturally significant sites – may provide landowners with new income opportunities. The following are some examples of heritage tourism ventures:

**Historic Farm Tours:** With planning and effort, Century Farms or others that have original farm structures or equipment may serve as heritage tourism attractions. While our Nation's heritage is deeply rooted in agriculture, the urban connection to our agrarian background is growing weaker. Farm and folklife tours are increasingly used to educate people about both historic and modern methods of food production.

**Reenactments:** Some farms and ranches include historically significant land, such as land that served as a site of a Civil War battle, as a way station for weary settlers on their route West, as part of the underground railroad, or as the home of a famous American. These areas might be appropriate sites for reenactments, other educational activities, or festivals.

**Cultural Events:** Farms, ranches, and other lands located in beautiful settings with adequate open space may be attractive sites for outdoor plays, concerts, fairs, and cultural festivals. Even if a farm isn't appropriate as a tourist attraction itself, it may offer hospitality services, such as food, lodging, or agri-entertainment to tourists enjoying nearby cultural or historical attractions.

### Why Heritage Tourism?

Historic and cultural tourism is enjoying increased popularity and generating income for individuals and communities. Studies show that visitors to historic or cultural attractions tend to spend more money per trip and

take longer vacations compared to all other travelers. Heritage tourism also helps preserve a community's unique character and can help diversify local economies.

Moreover, heritage tourism is a flexible income source. Operators can control when the sites will be open. This allows operators to continue farming while offering value-added tourism during certain times of the day or year. Attractions can be open for single annual events, seasonally, or daily with restricted hours.

### What Should You Consider?

**Resource Assessment:** Does your land have natural resource attributes, such as streams or ponds, vistas, or open spaces that would make it an attractive tourist destination? Does your land have a roomy home that could provide lodging, such as a bed and breakfast, for tourists? Do you have open space that could accommodate fairs, festivals, plays, or other events?

Do your land or buildings have unique historical significance? Is your farm located in an area with unique historical or cultural significance?

**Customer Base and Marketing:** Who are your potential customers? Families with children? Retirees? Amateur historians? Are they located nearby, or do you hope to attract tourists from distant areas? Would your venture be a destination attraction, or a place that tourists might stop on their way to their destination? Are there other historical or cultural attractions nearby that would help draw tourists to your site?

**Infrastructure:** What new facilities, such as restrooms and parking areas, must you provide if large groups visit your land? Are there ample and suitable lodging and dining facilities nearby? Are the roads and other local transportation systems well suited for tourism?

**Opportunities for Collaboration:** What other local organizations, governments, or businesses can you collaborate with to enhance the financial opportunities of your tourism venture?

**Legal Matters:** What are the liabilities of allowing tourists on your property? What types of insurance must you carry? Is your land zoned, or capable of being rezoned, for tourism activities? What safety regulations might you be required to comply with?

## Where To Get Help

There are a number of information resources that can help you get started on your new venture. A few of those resources are listed below. For more information, contact your USDA Resource Conservation and Development Council area office. For a national listing of RC&D offices, see <http://www.nhq.nrcs.usda.gov/RCCD/rc&dstate.html> on the web or call the Natural Resources Conservation Service at your local U.S. Department of Agriculture Service Center (in the phone book, under "Federal Government").

For a national listing of alternative enterprises and agritourism liaisons, see <http://www.nhq.nrcs.usda.gov/RESS/econ/ressd.htm>.

### **National Trust for Historic Preservation**

Through its Heritage Tourism Program, the National Trust for Historic Preservation offers technical assistance on strategic planning, preservation, tourism development, interpretation, and marketing on a fee-for-service basis. They also offer low-cost "how-to" publications on heritage tourism, an introductory video, and a resource manual that lists additional organizations that can help you start your new venture.

For more information, see <http://www.nationaltrust.org> and click on "publications" or call (202) 588-6286. To reach the Heritage Tourism Program staff, call (303) 623-1504.

A free heritage tourism fact sheet is available from the Trust's regional offices. To locate the regional office nearest you, see <http://www.nthp.org/main/frontline/resources.htm> on the web.

### **U.S. Department of Agriculture (USDA)**

USDA's Forest Service produced a heritage tourism development model that helps landowners and communities assess and develop a heritage tourism enterprise. To get a copy of the report, contact USDA

at (202) 720-2307. An electronic copy can be found at <http://www.nhq.nrcs.usda/RESS/econ/ressd.htm> on the web.

### **Appropriate Technology Transfer for Rural Areas (ATTRA)**

ATTRA offers tip sheets on a variety of alternative enterprises and provides tips on evaluating potential agritourism ventures. For helpful information on agri-entertainment, see <http://www.attra.org/attra-pub/pickyour.html> on the web, or call (800) 346-9140. ATTRA also provides useful information on marketing and evaluating alternative agricultural enterprises. ATTRA is sponsored by USDA's Rural Business-Cooperative Service.

### **Travel Industry Association of America**

A membership organization, TIA provides information on tourism research and resources. You can contact them at 1100 New York Avenue, NW, Suite 450, Washington, DC 20005-3934, (202) 408-8422, Fax (202) 408-1255 or see <http://www.tia.org> on the web.

### **State Departments of Tourism**

All 50 states have tourism offices that can provide you with additional information and resources to get you started. To find the address, phone number, or website address for your state tourism office, see the Tourism Industry Association of America (TIA) website at <http://www.tia.org/discover/getallstos.asp> or call TIA at (202) 408-8422. Also, contact your local convention and visitors bureau.

### **Farming Alternatives Program (FAP), Cornell University**

FAP has produced a step-by-step workbook to help you plan and evaluate a new enterprise. The workbook, *Farming Alternatives: A Guide to Evaluating the Feasibility of New Farm-Based Enterprises*, can be ordered by calling (607) 255-9832. FAP also offers an agritourism resource packet and a report providing in-depth case studies of agritourism in New York. Also see <http://www.cals.cornell.edu/dept/ruralsoc/fap/fap.html> on the web.

For additional copies of this information sheet, AE-3, call 1-888-LANDCARE or see the website at <http://www.nhq.nrcs.usda/RESS/econ/ressd.htm>.

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# Tourism Trails

*This fact sheet is one of a series developed by the Ohio State University Extension South District Tourism Team to help communities be more effective with tourism as a sustainable development strategy and to enhance visitors' and tourists' travel experiences in our region.*

## HERITAGE TOURISM

Rebecca A. Baer, Extension Agent, Meigs County

Heritage tourism is becoming one of the most popular forms of tourism. Heritage tourists spend almost 6½ days on vacation compared with other types of tourists who spend only four days. One-fourth of tourists see historical sites and participate in heritage activities while traveling. These visitors stay longer and spend more money than other types of sightseers. They tend to be families with children or well-educated, high-income older adults.

Heritage and cultural tourism generated \$14.4 billion in Ohio in 1998. Sadly, only 6.8% of that went to Southeast Ohio. What can be done to promote Appalachian Ohio for heritage tourists so that it can reap its share of the profits?

### What Is Heritage Tourism?

According to the National Heritage Tourism Research Forum, heritage tourism is traveling to experience the places and activities that authentically represent the stories and people of the past. It is based upon the reality of a particular region - - culture, history and natural environment - - making it unique. The architecture, landscapes, historical legacies, traditional practices, memorabilia, cuisine and arts and crafts all combine to make a heritage area distinctive and extraordinary.

Heritage areas are regional and federally designated. Currently there are 300 nationwide and five in various stages in Ohio. They not only provide a huge economic impact on the area, but also have great social value. Community pride is a result of the additional sites, activities and events that are developed for heritage tourism. Residents gain a deeper appreciation of their area, its history and traditions.

### Heritage Tourism Principles

There needs to be a balance between the history that made the area special and the development of the tourism industry

to promote it. The National Trust for Historic Preservation in the United States has specified the following principles:

1. Emphasize authenticity and quality
2. Preserve and protect natural resources
3. Permit sites to become alive with participation
4. Determine how the community and tourism can complement each other
5. Collaborate at all levels

### Common Heritage Area Characteristics

Heritage areas tend to:

- ◆Have a sense of place. There are family and social ties to the area.
- ◆Be multi-county. It is a region not just an isolated location.
- ◆Provide similar economic development opportunities.
- ◆Have local people where the culture is distinctive.
- ◆Have a central coordinating office. The organizing and arranging of regional activities work best when handled through a clearinghouse.

### How Can an Area Become a Heritage Tourism Destination?

Determine the story your area wants to tell. What aspects of the region are most unusual? Sites, cuisine, attractions, souvenirs, facilities, etc. need to be authentic. What can you do to entice people to come back? Visitors need to have a memorable first experience in order for sustainable development to occur with tourism.

What are the attractors to the area? What serves as magnets to draw people in the first place? What attractions entertain and educate them while in the region? What historical sites, recreational activities, shops, side trips,

restaurants, etc. could be incorporated on tours? What uncommon extras could be included to prompt travelers to "linger longer?" These bonuses could be speciality shops and places to stop while the tourists are in the area.

Finally, there should be interesting and intriguing places for local residents to patronize. Museums, craft shops and stores should also be available for local consumption. These businesses should be open longer and more accessible. Since the tracing of family ancestors has become a common pastime, historical museums need to be accessible for charting family genealogies for natives of the area as well as for out-of-towners who visit on weekends.

Heritage tourists need places to eat, sleep, tour and shop. Restaurants should provide local cuisine as well as foods and culinary styles from other areas. Hotels, hostels, Beds and Breakfasts, motels and inns should be available to supply the need for overnight accommodations.

Shopping has become the number one activity of visitors to Ohio's Hill Country. Food products and crafts are often desired.

Familiarization (Fam) tours can be developed to depict heritage themes. Cottage industries, home-based businesses, craft shops and art studios can tie the tourism routes together.

There is going to be more competition among regions vying for the heritage tourist. Prospective guests may become overwhelmed by the amount of information explaining travel destinations. Heritage areas need to emphasize the value of history and the past and take steps to assure that preservation is secured for future generations.

### **What Heritage Destinations Can Do to Promote Tourism**

- ◆ Develop an authentic product. Visitors want to see the real thing. Reproductions are not as desirable
- ◆ Educate through interactive education and entertainment. By engaging tourists in the history of the area, they can appreciate the historical significance of the event and the region. Activities can be both participatory and passive.
- ◆ Market your area strategically. Have a travel route mapped with an itinerary. Take the tour to be sure that it makes sense. Develop corridors based upon themes - which may include history, culture, and nature.

Avoid naming counties. Refer to locations by towns or routes. Have the routes begin and end with major highways. Make it easy for the tourist by providing packaged tours that include places to eat, sleep, tour and shop.

Because the historical past is evident throughout Southern

Ohio, tourism businesses should focus on it. Twenty-one percent of travelers to Ohio's Hill Country are likely to tour historic sites as opposed to 6.5% statewide. Sites include prehistoric Indian mounds, the first state capital, the state's oldest standing courthouse, the state's only Civil War battlefield, murals depicting the area's history and culture, etc. Since Appalachian Ohio follows the Ohio River, the river can serve as a backdrop, not just because of its historical significance, but also as a component of soft adventure tours.

- ◆ Manage the capacity of travelers that you want to attract. Collaborate throughout the region to determine the logistics of handling great numbers of visitors.

Areas within a region should partner with each other. Package tours of several different sites should be available for discount prices.

- ◆ Encourage hospitality training. Those people working the front lines in restaurants, hotels, gas stations, tourist businesses, shops and stores should understand the area's heritage and the importance of tourism. They should be trained in relaying information about the historical attractions and people of the area. Employees should exhibit impeccable manners, exceptional service and good public relations. It is essential that they focus on the opportunities of which travelers can take advantage instead of the problems of the area.

Southern Ohio can become one of the state's major tourist attractions. Tourism professionals and interested citizens can work together to make the vision happen. The history and heritage are already there; collaboration and planning can bring it to realization.

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# Liability and Legal Issues

## **Liability Insurance for Landowners and Hunting Clubs (revised 6/8/04)**

### **LIABILITY INSURANCE FOR LANDOWNERS AND HUNTING CLUBS PERCEPTIONS AND REALITY**

**James E. Miller, Extension Outreach/Research Scientist, Department of Wildlife and Fisheries, Mississippi State University, Box 9690, Mississippi State, MS 39762-9690**

#### **LIABILITY INSURANCE:**

Insurance is a contract where an insurer (insurance company) undertakes to indemnify the insured (person purchasing the insurance) against loss, damage, or liability arising from an unknown or contingent event. The insured pays the insurer a premium for this coverage. Liability insurance covers loss due to negligence, but not loss due to a willful act, of the insured. Negligence is one of the conditions that through risk planning can be greatly reduced on most private lands. Liability insurance companies generally limit the total liability of the insurance company to a specified sum, which may be much less than the liability incurred by the insured. Therefore, liability insurance may not completely eliminate the loss which the insured incurs, but it does reduce the risk of loss. Many landowners who already have liability insurance on their property can work with their insurer to add a rider as a supplement to their existing policy to cover liability for a hunting lease. Others may require that the hunting club or lessee's obtain liability insurance as a part of the written lease agreement. Many landowners will also prepare or have an attorney prepare for them a hunting club disclaimer that all hunting club members or lessee's must sign that points out potential risks that are found on the land, such as an abandoned well, or livestock that may need to be avoided, etc. Disclaimers may not be legal, but they do serve to warn lessee's of potential risks and may prevent a liability suit if the lessee's ignored the identified risks that they signed a waiver for.

There are a number of insurance companies that offer liability for hunting clubs or for landowners who lease their land for hunting or other recreational access. The following list is by no means exhaustive, however, it does provide some sources of information about liability insurance, coverage, costs, and comparisons. Another source that should not be overlooked is a rider to existing policies to cover recreational access including hunting. A landowner owes anyone paying for access to their lands for hunting or fishing or other recreational use certain duties of care, such as posting warnings as to dangerous conditions on the property, including potentially dangerous animals, abandoned wells, old buildings and other structures. He may be liable for injuries to a hunter caused by another hunter if not covered by insurance. Liability may be based on landowner negligence in allowing too many hunters in a given area, or by admitting an intoxicated hunter who subsequently injures another hunter as some examples.

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**HUNTING CLUBS AND LAND OWNERS:  
LIABILITY ISSUES AND HUNTING LEASES**

Prepared By:

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J. Wilbourn Vise

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**I. LIABILITY ISSUES FOR LAND OWNERS AND HUNTING CLUBS:  
WHAT YOU CAN DO TO PROTECT YOURSELF**

**A. Introduction**

Land owners, have you ever considered what would happen if you allow a group of hunters or a hunting club to use your land and there was an accident? What about hunting club members? Have you ever considered what would happen if a guest fell from a poorly constructed deer stand or a member accidentally shot another? Of course we all hope that these things never happen, but unfortunately they do. So what steps can we take to prevent them from happening, and to minimize the negatives both legally and practically? These materials will take a broad look at some of the liability issues concerning the lease and use of land for recreational purposes for both hunting clubs and land owners as well as measures that can be taken to reduce legal liability for both.

**B. Land Owner Issues**

Land owners face potential liability when they allow others to use their land for hunting, fishing, hiking, camping, etc. However, the state of Mississippi along with many other states have passed recreational land owner liability statutes that limit the liability of land owners in certain situations.

Pursuant to Section 89-2-23 of the Mississippi Code, landowners who open their land to the public without charging a fee do *not* have a duty of care to keep their land safe for entry or use by others for hunting, fishing, etc. *and* shall *not* be required to give any warning of dangerous conditions to the same. This law also applies to person(s) to whom the land owner gives permission to use the land. Miss Code Ann. §89-2-25. This protection applies in all situations *except* where a land owner willfully or maliciously fails to guard or warn of a dangerous condition; if the land owner was paid any compensations for use of his land other than by the federal, state, or local government; or in a situation where a third party to whom the landowner owed a duty to keep the land safe is injured by acts of person(s) given permission to hunt, fish, etc.

These statutes are applicable to land owners who allow others to use their premises for hunting, fishing, hiking, camping, etc. so long as the person is not willfully, deliberately, or

maliciously injured *or* no fee is charged by the land owner for use of his land, or if notice that the land is open to the public is not published at least once annually in a newspaper in the county where the land is located. Basically, this law will not apply to land owners who have leased their land to a hunting club or others and charge a fee for using his/her land for recreation activities. If landowners do not meet the requirements set forth in these statutes, then they will be subject to potential liability as established by the courts.

Once land owners accept any payment from a club or individual for the use of lease of land they are no longer protected by the limited liability statutes outlined above and become subject to common law levels of liability established by the Courts. There are three (3) status levels recognized in Mississippi and in the majority of states when on the land of another: (1) trespassers, (2) licensees, and (3) invitees. The duty of care a land owner owes to each is determined by how the court classifies the person.

1. Trespassers.

A trespasser is a person who enters another's land without license, invitation, or other right. The duty of care owed to a trespasser is that the land owner may not willfully or wantonly injure the trespasser. Practically, this means that you as the land owner cannot set up booby traps such as spring guns, bear traps or otherwise to injure someone who enters your land without permission. A better option is to post your land and call the proper authorities if you notice people trespassing on your land.

2. Licensees.

A licensee is a person who enters the property of another for his own convenience or pleasure pursuant to the license or implied permission of the owner. The duty of care owed to a licensee is the same as that of a trespasser, to refrain from willfully or wantonly injuring them. The Mississippi Supreme Court has made a simple negligence exception to the duty of care owed to licensees that applies to land owners whose (1) active negligence subjects a licensee to unusual danger (2) when the presence of the licensee is known. This exception does not apply in the case of a licensee who is injured as a result of a condition on the land through passive negligence. This rule of liability is based on the theory that a licensee receives permission to be on the land as a gift, because there is no benefit given by the licensee and the licensee must take the land as he finds it. To be cautious, however the land owner should still warn of or repair known dangerous conditions.

### 3. Invitees

The final status level is that of an invitee. An invitee is a person who enters the land of another in response to an express or implied invitation of the owner for the mutual benefit of the parties. The duty of care a land owner owes to an invitee is to keep the premises reasonably safe and where unsafe conditions exist, to warn of any known danger not in plain and open view. If the land owner receives any compensation from the hunters or the hunting club, then the land owner will owe the hunter or hunting club a duty to keep the premises reasonably safe and to warn of known hidden dangers.

#### **C. Hunting Club Liability Issues.**

Hunting clubs, just like land owners, have their levels of liability and duties determined by the status of the person that is injured; trespasser, licensee, or invitee. For the most part, the majority of hunting club guests fall into categories of either licensees or invitees. What are some typical causes of accidents in hunting clubs? Poor maintenance, the cabin or shanty with the broken steps or rails. The three or four people skinning a deer, each with a sharp knife, and multiple fingers within cutting range. The old homemade bridges you have to cross to get to your favorite stand, that old wooden tree stand with the creaking boards and missing ladder rungs. It only takes a little time to repair these items or exercise a little caution versus being held liable for accidents caused by ill-repair. Other causes of accidents include the mixture of alcohol and guns, the absence or non-enforcement of club rules, and/or failure to abide by the safety laws set out by the state.

What happens in the event that one of your members or guests get hurt on the club's premises, or worse yet, shot during a hunt? Is it not foreseeable that the injured person or his family might ask the club to pay the medical bills, along with compensation for his pain and suffering, especially if the accident or mishap is due to someone else's carelessness or negligence? What if your club is unincorporated and has no insurance? Who pays?

The only sure way to protect against legal liability is to prevent accidents from happening in the first place. It is impossible to overemphasize safety issues in hunting clubs. Safety should be made a top priority, if not *the* top priority in every hunting club. Unfortunately, safety is a topic which many hunters don't want to think about, much less discuss. Many hunters think they are extremely safe and cautious and that they will never be involved in an accident or mishap. But consider the following statistics: there were 71 hunting related accidents in Mississippi

between 1998 and 2000 as reported by the Mississippi Department of Wildlife, Fisheries and Parks (“MDWFP”) in a two year study.<sup>1</sup> Of the 71 incidents, 35 involved accidental shootings of another person while 11 were self-inflicted. The remaining 25 accidents involved the use of tree stands with 8 occurring in 1998-99 and 17 in 1999-00. The MDWFP began tracking tree stand accidents several years ago. In the first reporting year, 19 accidents were reported with causes ranging from poorly secured stands, to steps coming loose, to carelessness like slipping on the steps or falling asleep. From July, 1999 through June, 2000, the MDWFP investigated approximately 23 separate shooting accidents, 8 of which were fatal. That compares to 23 accidents with 4 fatalities from July, 1998 through June, 1999. There were also several fatalities attributed to tree stand accidents over the past year.

With the time for pre-season club meetings and clean-up days upon us, many hunting club members will be more concerned with finding out where the deer are concentrated, where the food plots will be placed and the best place for their tree stands. Please also take time to discuss all rules and go over basic hunting safety. Safety issues should be put on the agendas of our hunting clubs as a top priority.

**D. A sampling of lawsuits concerning hunting clubs.**

Discussed below are several cases which illustrate the types of issues which have given rise to lawsuits concerning hunting clubs, not just in Mississippi but in other states as well. Ask yourself if things like this could happen at your club?

1. Hall v Booth, 423 So. 2d 184 (Ala. 1982). At issue was the liability of an unincorporated club for the death of a 13 year old boy shot during a deer hunt. The family of the boy sued all the members of the club claiming they failed in their duty to conduct a safe hunt. Two organized hunts were conducted that day, with some members acting as drivers and others as standers on one of the roads in the woods. During the second hunt, one member sent several hunters down a road with instructions to act as drivers. The drivers testified that they were told nobody else would be on the road. When the signal was given to begin the drive, one of the drivers heard a noise, turned and saw movement. He fired twice at what he thought was a deer. Unfortunately, he killed the 13 year old boy. In this case, the court dismissed the claims against all of the members except the shooter, holding that the

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<sup>1</sup> It should be noted that the report covers accidents during all hunting seasons, not just deer season and includes figures for both shootings and treestand accidents. A breakdown of the accidents by type of hunting is as follows: Deer-46, Turkey-2, Rabbit-8, Squirrel-4, Duck/Geese-2.

proximate cause was not in the planning of the hunt. “When a hunter fires without identifying his target and shoots another person, that irresponsible act is the proximate cause of injury regardless of some negligence on the part of the victim.” To impose liability for negligence, the “injury must be a natural or probable consequence of the negligent act or omission which an ordinarily prudent person ought reasonably to foresee would result in injury.” Without getting too deeply into the facts, it appears the club members were very lucky to escape liability. What if the organizer of the hunt had said, “Boys, we’ve got to put some meat in the freezer and I don’t care what you shoot.” What if the shooter had been drinking all afternoon yet they let they let him participate in the hunt? Maybe the court would not have been as lenient with the club members.

2. Orsner v. George, 252 Cal. App. 2d 660 (Cal. 1967). Decedent was shot by one of two men who were target practicing during a weekend cleanup visit. The men were shooting pistols at “frogs and mudhens” over a pond which adjoined the clubhouse and accidentally shot a man who was out of sight across the pond working on some farm equipment. Five men were staying at the clubhouse that weekend and all had engaged in some form of target practice at one time or another. All the members of the unincorporated club were sued, some of whom were not even present at the time of the shooting. The court carefully examined the level of participation and encouragement provided by all the defendants. Ultimately, The court found that the non-shooting members encouraged the shooters or participated in the shooting. Fortunately for those not present, the shooting was held not to be a part of the purposes of the club and the shooters were not “acting within the course and scope of their activities as club members.” It was also held that two members who were sued but were not present at the time of the shooting could not have failed to exercise reasonable care “to control” the shooters since they did not even know about the shooting.. However, another member (who was present), was not dismissed since there was triable issue of fact as to whether he failed to exercise reasonable care to control the activities of the shooters. The lesson seems clear that all club members should take an active role in stopping activities which are dangerous, careless or in violation of a club’s rules. Not permitting target practice next to the clubhouse is a very common rule. If you see a member sighting his rifle close to your clubhouse after missing a deer during the morning hunt will you put a stop to it? Many club members don’t want to be perceived as trouble-makers or hard to get along with. But it is important that all club members take an active role in the enforcing rules and safety guidelines. As this case demonstrates, you could be found to be a participant in a negligent activity by going along with the activity or encouraging it.
3. Ermert v. Hartford Insurance Co., 559 So. 2d 467 (La. 1990). During a work day at an unincorporated duck club, one of the members saw a nutria swimming across a canal outside. He quickly began to load his shotgun but while walking through the clubhouse the gun accidentally discharged striking the plaintiff in the foot. The club had club rules years before, but the men had become good friends and were now in “general agreement” on safety matters, adhering to common sense safety guidelines which all hunters should follow, such as no loaded guns in the camp. The plaintiff sued all the members of the club based on the premise that they were all liable for the actions of one of their members, for failing to adhere to any safety rules, and the fact that the shooter was acting

with the tacit approval of the other members. The Louisiana court held that one member is not liable for the actions of another simply because they are both members of an unincorporated association. Instead, members are personally liable only for tortious acts which they individually commit, participate in, authorize, assent to or approve. In this case, the various individuals were again fortunate to avoid liability for the actions of the careless member. This case underscores the need to have adequate rules, enforce them and not to get caught up in a careless activity.

4. Lumbley v. The Ten Point Company, Inc., 556 So. 2d 1026 (Miss. 1989). The wife of a club caretaker was injured when she fell through stairway railing on the premises of an incorporated hunting club. The woman was leaning over a rail to hand something to her husband when the railing gave way, resulting in a fall onto a concrete surface. She suffered broken bones, multiple injuries and a 28-day stay in the hospital. Apparently, there was rotting wood around the nails holding the rail to the posts. This case is important in that it discusses the three types of status one can have upon the land of another, which in turn determines the duty owed by the landowner. One can be a trespasser, licensee or an invitee. An invitee goes upon the premises of another "in answer to the express or implied invitation of the owner or occupant for their mutual advantage." A licensee enters another's land "for his own convenience, pleasure or benefit, pursuant to the license or implied permission of the owner." Members of a hunting club would appear to fit into the category of either an invitee or licensee most often. Property owner owes a licensee a duty to refrain from willfully or wantonly injuring him. A greater duty is owed to a business invitee, that being "the duty to exercise reasonable care not to enter him." In this case, the caretaker's wife was an invitee, there for the benefit of the club. The key legal issue in determining Ten Point's liability was "whether Ten Point knew, or in the exercise of reasonable care, should have known, the defective condition of the rail and that it constituted a danger and hazard to persons using the stairway." Ten Point was able to convince the jury that the rotting was a hidden, latent defect that they could not have discovered in the exercise of reasonable care without dismantling the stairway. A property owner is only liable to an invitee for those hidden or latent defects which are known to the owner in the exercise of reasonable care. A lesson for hunting clubs is to exercise due care to make sure the premises are reasonably safe, to repair obvious and reasonably obvious problems, to place warning signs where you know dangerous conditions exist. Ask yourself what a reasonable person would do about a given situation and proceed accordingly. This does not mean hunting clubs must keep their premises in perfect condition, only reasonable condition. If a deer stand is about to fall out of a tree, fix it or tear it down before it falls with someone in it. If the bridge across the street is about to collapse, either put a warning sign in front of it or repair it.
5. Dumas v. Pike County, 642 F. Supp. 131 (S.D. Miss. 1986). Plaintiff had rented an intertube to float the Bogue Chitto Water Park with his friends. They eventually came to a clay embankment where swimmers obviously jumped or dived into the river on a regular basis. The land was privately owned. The plaintiff dove into the river from the embankment, struck his head on the river bottom and was rendered a quadriplegic. There were no warning signs. The land owner argued that the plaintiff was a trespasser, to whom he owed no duty except to refrain from willfully and wantonly injuring him. Court

pointed out, however, that the law is not so restrictive because the plaintiff's status could rise to that of a licensee. A licensee is a person privileged to enter onto the land of another by virtue of the consent or permission of the owner. Significant in this case, consent to enter land can be expressed by acts other than words. The condition of the land can be an indication of that consent. In this case, for instance, a land owner supposedly knew people used the land but had posted no warning signs. Also, there was a well worn foot path leading up the embankment and two earthen platforms for diving. If his status rose to that of a licensee, then the landowner would not have a duty to keep the land in a "safe" condition, but would have a duty to "disclose and concealed, dangerous conditions on the premises of which the possessor has knowledge, and to exercise reasonable care to see that the licensee is aware of the danger." Under the circumstances, the lower court decided to let the matter proceed to trial against the landowner.

6. Reed v. Employers Mutual Casualty Company, 741 So.2d 1285 (La. 1999)  
Reed, a member of the hunting club, was injured when he fell from a movable tree stand that collapsed beneath him. Reed sued the treasurer of the hunting club who installed the stand and his insurance company for negligence in constructing the stand. The hunting club was unincorporated. The member who made the tree stand was found to be at fault for negligence.
7. LaBorde v. Scottsdale Insurance Company, 704 So.2d 247 (La. 1997). A non member guest of a hunting club member was shot and injured by a member of the hunting club who accompanied the guest and his friend. The hunting club was organized as a nonprofit corporation. The guest sued the hunting club to recover for his injuries. The guest and his friend were on their 4-wheeler on their way to pick up the second hunting club member. While approaching the stand to pick up the second member, the member fired his rifle at the 4-wheeler hitting the guest. The second member stated he aimed his gun and thought he was shooting at a hog. The jury found the second member 95% responsible and the hunting club 5% negligent. On appeal, the hunting club was absolved of any liability with the court finding that the hunting club could not have done anything to prevent the shooter from actually taking the shot.

## **E. Legal Devices to Minimize the Liability.**

### 1. Incorporate

One way to minimize liability exposure is to incorporate your club. A properly organized corporation shields its shareholders or members from personal liability for club activities. If you are a land owner, you may consider creating a limited liability company or other legal entity and transferring the land you intend to lease to it. Incorporating protects the land owner from being directly liable for mishaps. Accordingly, while an injured person may have a cause of action against the club or the entity holding title to the land, he may be precluded from attaching the personal assets of the individual members or land owner. This is a very



important consideration for hunting clubs because many clubs are nothing more than unincorporated associations, groups of hunters who are pooling their money to pay for a hunting lease. Unincorporated associations do not shield their members from personal liability. If you as a land owner or club member decide to incorporate, records will need to be maintained, annual tax returns filed and minutes of meetings kept. Corporate formalities like proper elections of board members and officers should also be followed. The cost of incorporating may be less than you think, and the benefits of reducing liability may far outweigh the organizational costs. More sophisticated clubs may have detailed agreements dealing with transfers of stock, inheritance of stock by family members, buy-sell agreements, etc. Limited liability companies are becoming increasingly common as a choice of entity. Besides liability issues, tax considerations may also play a major role in the proper choice of entity, especially for clubs that own, rather than lease their land. You should always consider the tax implications before conveying land. Many large landowners such as International Paper and Georgia Pacific require hunting clubs to incorporate before they will enter into leases with them.

## 2. Insurance

Another method to limit financial exposure is to purchase a general liability insurance policy to protect the hunting club or land owner. While many land owners have homeowners' insurance policies already in place, the activities allowed by a lease agreement may not be covered by the general policy. The land owner may need to invest in a rider to the policy or require the hunting club to carry a general liability insurance policy with the land owner named as an additional insured. Regardless of whether the land owner requires the hunting club to carry liability insurance, it is still a good idea for a hunting club to purchase some sort of policy.

Many insurance companies offer policies that are both affordable and offer liability protection to hunting clubs. Additionally, by allocating the premium cost in the annual dues, the per member cost may make the insurance premiums affordable. You should take care to review the exclusions and make sure what types of mishaps are covered. For example, some policies only cover accidents which occur on the land, but not accidents in the physical structures such as the clubhouse or deer stand. Four wheeler accidents may also be excluded. You should be sure that you as an individual fully understand the extent of coverage under the club's policy. If you believe that more coverage is needed, you may consider purchasing an individual policy to protect your individual interest.

In Dartez v. Western World Ins. Co., 569 So. 2d 1089 (La. 1990) a club member was liked by an explosion when he attempted to light an old gas stove in his private camp. One of the knobs was missing on the stove and had apparently been left on releasing gas. Most of the club members had personal camps which they maintained on the club's leased land. An issue arose as to whether the accident was covered by the club's policy. No coverage existed for private camps. The club president claimed he had told the member to include their personal camps on their individual homeowners' policies. Other members, however, testified that they had always understood that their camps were covered by the hunting club policy. The insurance company also argued that it was liable only for the negligent actions of officers, directors and employees of the club, but not the individual members. The lesson is clear that hunting club members should make sure they understand what their club's policy covers. Don't wait until you need the coverage to learn about the policy's exclusions.

### 3. Waivers

Some land owners require hunting clubs to sign waivers or releases of liability before leasing land to them. Hunting clubs sometimes require their own members and guests to sign waivers of liability before allowing them to hunt. The waiver agreement must be based on offer and acceptance between two parties in equal bargaining position. The waiver must be based on some consideration. This consideration does not have to necessarily be money, the exchange of the right to hunt for agreeing not to sue may be enough. A waiver of rights should be carefully drafted to ensure its legality. Courts sometimes take a dim view of waivers when there is not adequate consideration flowing to the person who is giving up what may be an extremely valuable right. The hunting club should consult an attorney to be sure that their interests are protected.

## **F. Practical Ways to Minimize Liability.**

### 1. Choose Good Leaders

The most obvious way to avoid liability is to prevent accidents. This starts from the top and flows downward. If the leaders set a tone of carelessness, lawlessness and foolishness, then the standard of conduct will likely be followed by most of the other members. That's also the example the children will pick up from the adults. Consider this the next time the time comes to elect officers. Be sure to pick someone who sets the right tone, commands the respect of the other hunters, hunts ethically and within the game laws, and will not be intimidated when the

time comes to enforce the rules, collect a fine, report a violator to the game warden, suspend or even expel a member. Of course, it is always easy to find someone willing to take on those responsibilities, but the point is that the tone will be set at the top, so choose your leaders carefully.

2. Make Rules not Suggestions.

Decide whether the club is going to have rules or suggestions. Many clubs claim to have rules. You'll find them posted on the bulletin board. Unfortunately, these rules will not do any good if no one will enforce them. Everyone, including the non-officers, should do their part to enforce the club rules. If a rule isn't worth enforcing then it may not be worth having. A good lawyer may use that fact to demonstrate that the club knew a certain type of conduct was unsafe yet everyone just looked the other way.

There is no universal set of rules that apply equally to all clubs. Different clubs have different problems and safety concerns that need to be addressed. Some of the more common rules would include: no drinking during hunting hours; no loaded weapons in the clubhouse or in vehicles; no target shooting on clubhouse premises; hunter orange required to be worn; children no allowed to carry a firearm before completing hunter education course; no shooting of illegal deer; all state and federal game laws to be followed. Other issues which bear consideration by your club may include the age at which children may be on a deer stand unaccompanied by an adult. This can be a tricky issue but bears consideration by your club. Also, does your club have an effective system in place to make sure where everyone is hunting? This can help prevent unexpected encounters in the woods. Many clubs do not allow members to get off their stands at certain times of the day. It may also be a good idea to schedule a short refresher safety course through the Hunter Safety division of the MDWFP. Some clubs require all of their members to take the hunter safety course, regardless of whether they are grandfathered in.

3. Make Safety the Primary Issue.

When your club holds its next cleanup day or organizational meeting, make sure that safety makes it onto the agenda. Discuss any potentially dangerous conditions on the premises which should be repaired. Evaluate your club's rules. Are they sufficient or are new ones needed? Are the club rules being enforced? Are the formalities of the corporation being kept up with if you are an incorporated club? Do you have liability insurance? What exclusions exist in your policy? Have you observed safety problems at your club in the past few years that concern

you? Are illegal deer routinely killed at your club? If so, it may demonstrate one of two things: (1) hunters are not positive about what they are shooting at, or (2) do not respect the game laws. The next time they guess at a target it may be your son waling out of the woods at dark. Don't wait until an accident happens at your club to take a hard look at what your club is doing from a safety standpoint. By making your club as safe as possible you'll have more peace of mind in the woods and possibly avoid a tragic accident. Many tragedies occur every year. Please help yourself, your friends and your children this season. There's not a deer out there big enough to justify losing your son or friend.

## **II. HUNTING LEASES**

### **WHAT HUNTING CLUBS AND LAND OWNERS SHOULD KNOW**

Suppose the person your hunting club has been leasing land from suddenly passes away and his family decides to rent the land to someone else. What can you do to prevent them from renting or selling to someone else? The answer depends on the terms of the lease agreement signed by both parties. In Mississippi as well as most states, leases are required to be in writing or they are not enforceable. So, if you have been renting land for the past few years without a lease agreement in place, then you do not have a binding agreement and could lose your land at a moment's notice. The purpose of this section is to inform both land owners and hunting club members of the basic items that should be considered in any lease agreement and the different types of lease agreements to consider when drafting next year's lease.

#### **A. Types of Leases**

There are many different types of leases that can be utilized dependant upon the situation and willingness of the parties. First of all, there are the general lease agreements where the owner typically leases his land for a term of years to one person or club. The land owner may choose to lease part of his land to one club and part to another. The land owner may also choose to allow a person to go on a certain number of hunts over a period of time. Finally, the land owner may decide to seasonally lease the land. For example, a deer club could lease the rights to the land during deer season while a turkey club could lease the same land for turkey hunting. It just depends on the needs of both the club and/or leases and the land owner.

#### **B. Lease Terms**

Regardless of the situation, there are key things that should be included in any lease agreement.

1. The lease needs to be in writing to be enforceable.

The agreement between the parties is what every court looks at to determine whether there was an agreement, if it was breached and the damages available to the parties. If there is no writing evidencing an agreement then a dispute may come down to one party's word against another. This is why Mississippi and many other states require lease agreements to be in writing. In Thompson v. Potlatch Corporation, 930 S.W.2d 355 (Ark. 1996), an officer of a hunting club sued a land owner to enforce a verbal contract to hunt on the land owner's land. The club officer claimed that the land owner orally agreed to allow the hunting club to lease the land for hunting

and trapping. The hunting club had sued the land for many years in the past. The land owner decided to begin formally leasing the land to hunting clubs, but required each club to be incorporated and carry liability insurance. The hunting club complied with these and other requirements but was not awarded a hunting lease. The hunting club sued the land owner for breach of contract. The court found that there was not a written lease agreement between the parties and the land owner did not have to lease its land to the hunting club. The lesson to be learned from this case is to be sure that any type of lease agreement is formalized in writing in order to protect both the rights of the hunting club and land owner.

2. Accurate Description of Land.

The lease should contain an accurate description of the land to be leased. This is to insure a complete understanding by both parties where the boundaries of the land actually are. Descriptions such as “the old Porter farm” may not be sufficient to describe the leased property. If the description is unclear, it may cause the hunting club to wind up trespassing on someone else’s land and poaching deer that club members thought they had the right to take. You should also pay attention to the need for easements. You may need to pass through land you do not have the right to hunt upon. Make sure you can get to and from the leased property.

3. Clearly Identified Parties to the Agreement.

The parties to the lease should be clearly identified. A lease in the name of one of the club members is not the same as a lease in favor of the club. If you are incorporated, include the full name so that the lessor understands he dealing with a corporation. As a lessee be sure all of the persons leasing the land have executed the lease. Otherwise, you will not have a valid lease if the landowners don’t want you there.

4. Price Clearly Set Out.

The amount of the lease should be set out in clear terms so as to avoid confusion of how much is owed and when payment is due. Be clear about when payment is due. Failure to make timely payments may give the lessor the right to terminate the lease.

5. Activities Allowed on the Leased Land.

The lease should set out what activity(s) the club is allowed to conduct on the land. This includes the type of game to be hunted, the amount allowed to be taken and other things such as the allowance of group hunts and the number of members and/or guests allowed on the land at any

given time. Be clear about what is expected buy the hunting club is terms of maintenance, closing gates, etc.

6. Term of the Lease

The length of the lease should be set out in clear language. A land owner may be inclined toward a short term lease to allow the land owner to determine what kind of tenant the person or club is going to be. If the club is responsible and takes care of the land, then the land owner may decide to re-lease the land to the club. The club, on the other hand, may want a long-term lease before making a significant investment in game management and physical facilities.

7. Escape Provisions.

The lease should have provisions allowing both land owners and hunting clubs to terminate the lease upon the happening of certain events such as violating the state game laws, upkeep of the property, land owners failure to maintain the roads, etc. Consider what problem would necessitate termination of the lease. What if the land owner cuts all the trees? Would you still want a five (5) year lease of clear-cut property?

8. Ability to Sublease or Transfer.

The lease should set out whether the lease can be transferred or subleased. If the lease can be transferred or subleased, it should set out the terms under which a transfer or sublease will be acceptable to the land owner.

9. Renewal Options and Right of First Refusal.

The lease should state whether the lease can be renewed for additional terms. If so, the terms of the renewal should be clearly stated with provisions for rent increases and other options. A hunting club should try to negotiate the right to match any other offers for the lease of the land to prevent the guy down the street from offering a dollar an acre more to get your club property after the hunting has improved under your management. This is commonly called a “right of first refusal.”

10. Rights of the Land Owner.

If the land owner desires to reserve any rights to hunt on the land, it should be set out in the lease agreement.

11. Liability Insurance and other Liability Shields.

If the owner requires that the hunting club carry a liability insurance policy, the terms and minimum amounts of coverage acceptable to the land owner should be set forth in the lease.

Additionally, the land owner may require the hunting club to name him as an additional insured under the liability policy. The land owner may require that the hunting club agree to indemnify him from any suits resulting from injuries suffered by any hunting club members or guests thereof on leased premises. The land owner may additionally require the hunting club to become incorporated before any lease is executed. It is important to note that Mississippi does not recognize the right of an unincorporated association of individuals to execute legal documents such as leases. So for more and more hunting clubs, incorporating is becoming an increasing reality.

### **C. Benefits of Leasing Land.**

There are benefits for the land owner in leasing his land to a hunting club. The money derived from the lease should pay the property taxes on the land along with a little extra spending money in the land owner's pocket. If the hunting club is a good care taker of the land, then the land owner will not have to worry about upkeep of the land, trespassers and poachers. Having a hunting club on the land may help protect the land from any boundary encroachments, fires, and maintenance of buildings and roads on the property. Land owners should always strive to lease their land to responsible, careful individuals concerned with protecting the land, preserving the wildlife and turning the land into a great hunting area. In the same manner, hunting clubs must respect the land owner and treat the property as if it were their own. Access to far too many lands has been lost already as a result of irresponsible hunters who have aggravated land owners beyond repair.

*These materials should not be used as a substitute for professional legal counsel. They are presented for educational purposes, but the specific facts of any given situation will dictate potentially different conclusions.*



# Insurance Providers List (2006):

**Outdoor Insurance Group**  
Barney Barnhardt  
400 N. Woodlawn Suite 5  
Wichita, KS 67208  
Phone 1-888-683-7808  
email [insure@oigcorp.com](mailto:insure@oigcorp.com)  
website: [www.oigcorp.com](http://www.oigcorp.com)

**Gillingham & Associates, Inc.**  
8501 Turnpike Drive, Suite 200  
Westminster, CO 80031  
Phone: 303-428-5400  
website: [www.outdoorinsurance.com](http://www.outdoorinsurance.com)

**OutdoorsInsurance.com, Inc.**  
**R. TIM REED**  
P.O. BOX 6336, WHEELING, WV 26003  
Phone: 866-695-9040  
Home 1-800-552-9925  
Email: [tim@outdoorsinsurance.com](mailto:tim@outdoorsinsurance.com)  
website: [www.outdoorsinsurance.com](http://www.outdoorsinsurance.com)

**K and K Insurance Group Inc.**  
Ron Norton  
PO Box 2338  
Fort Wayne IN 46804  
Phone: (219) 459-5970  
email: [ron\\_norton@kandkinsurance.com](mailto:ron_norton@kandkinsurance.com)  
website: [www.kandkinsurance.com](http://www.kandkinsurance.com)

**Bramlett Agency**  
1000 Energy Center  
P.O.Box 369  
Ardmore, Oklahoma 73042  
Phone: 1-800-797-3371  
Website: [www.bramlettagency.com](http://www.bramlettagency.com)

**ISERA (International Special Event and Recreation Association)**  
Jim Quist  
8722 South Harrison Street  
Sandy, Utah 84070  
Phone: 1-877-678-7342

**Southeastern Wildlife Federation's Hunting Club Liability Insurance Program**  
Contact – Ms. Carol Cash Turner,  
Insurance Agent, Southeastern Wildlife Federation  
P.O. Box 1109,  
Montgomery, Alabama 36102  
Telephone: (334) 832-9453

**Meadows Insurance Agency Inc.: Steve Meadows**  
(The Virginia Deer Hunters Association, Inc. offers this plan for hunt clubs only)  
304 Turner Road  
Richmond, VA 23225  
(804) 745-9205  
FAX: (804) 272-9083

**Davis-Garvin Agency**  
Dr. Ed Wilson  
P.O. Box 21627  
Columbia, South Carolina 29221-9961  
Phone: 800-845-3163  
Website: [www.davisgarvin.com](http://www.davisgarvin.com)

**Davis-Garvin Agency**  
216-C Avalon Circle  
Brandon, MS 39047  
1-888-501-2960  
1-601-992-0227  
Fax: 1-601-992-0208  
Website: [www.davisgarvin.com](http://www.davisgarvin.com)

**Davis-Garvin Agency**  
2901 HWY 28 East Suite E  
Pineville, LA 71360  
1-318-619-9484  
1-888-594-9484  
Fax: 1-318-619-9467  
Website: [www.davisgarvin.com](http://www.davisgarvin.com)

**RELEASE OF LIABILITY AND  
ACKNOWLEDGMENT AND ACCEPTANCE  
OF DANGERS, RISKS AND HAZARDS  
OF HUNTING LEASE**

I hereby acknowledge that I have knowingly and willingly entered a Hunting Lease Contract, or become a party bound by the terms of a Hunting Lease Contract by and between \_\_\_\_\_ (hereinafter the Lessor), and \_\_\_\_\_ (hereinafter the Lessee) dated \_\_\_\_\_, 20\_\_\_\_. I understand the terms, provisions and conditions of that Hunting Lease Contract and agree to abide by its terms, provisions and conditions.

I further acknowledge and understand that no warranty, either express or implied, is made by the Lessor as to the condition of the hunting lease (hereinafter the leased premises) located in \_\_\_\_\_ County, Mississippi, or of any roads, buildings, gates or other improvements located thereon. **This document serves to warn me that dangerous conditions, risks and hazards do exist. My presence and activities on the leased premises expose both me and my property to dangerous conditions, risks and hazards, including but not limited to: poisonous snakes, insects and spiders; blinds and tree stands, whether or not erected by Lessor; erosion and general condition of the land, both on and off road ways, creating rough, hazardous and dangerous driving and walking conditions; animals both on or off the leased premises; the use of vehicles; and the implementation of forest management activities including timber harvesting. I acknowledge that hunting is an inherently dangerous activity, and I understand that my participation in hunting can possibly lead to serious bodily injury or death to my person. I hereby state that I am aware of these facts and expressly assume all such dangers, risks and hazards of entering the leased premises.**

In consideration for the right to enter the leased premises, I hereby release and agree to protect, indemnify and hold harmless \_\_\_\_\_ and his/her respective heirs, agents, employees and assigns from and against any and all claims, demands, causes of action and damages, including attorneys fees, resulting from any accident, incident, or occurrence arising out of, incidental to or in any way resulting from the use of the leased premises and any improvements located thereon, whether or not caused by the Lessor's negligence or gross negligence. This release applies during the time that I am permitted on the leased premises. I hereby further covenant and agree that I, my heirs, successors and assigns will not make any claim or institute any suit or action at law or in equity against the Lessor or his or her respective heirs, agents, representatives, employees, successors or assigns by reason of conditions of the leased premises or activities occurring thereon.

As used in this release, the terms *I*, *my person* and *myself* include minors in my care while on the leased premises.

Dated and signed this the \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_\_\_.

**IMPORTANT: THIS DOCUMENT IS A RELEASE OF LIABILITY AND AFFECTS YOUR LEGAL RIGHTS. YOU MAY WISH TO CONSULT AN ATTORNEY PRIOR TO SIGNING IT. DO NOT SIGN THIS RELEASE IF YOU DO NOT UNDERSTAND OR DO NOT AGREE WITH ITS TERMS.**

**IF PARTICIPANT IS UNDER EIGHTEEN (18) YEARS OF AGE, THE SIGNATURE OF A PARENT OR LEGAL GUARDIAN IS REQUIRED IN ADDITION TO PARTICIPANT'S SIGNATURE.**

\_\_\_\_\_  
DATE SIGNED

\_\_\_\_\_  
PRINTED NAME

\_\_\_\_\_  
PARENT OR LEGAL GUARDIAN  
IF PARTICIPANT IS A MINOR

\_\_\_\_\_  
PARTICIPANT (SIGNATURE)

Participant's Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Marketing

## **BUSINESS TO CONSUMER E-COMMERCE: SELLING ON THE INTERNET**

### **Buying and Selling Online is Here to Stay!**

A true story . . . a 40-something woman working full time and living in a small rural town decided during the 1999 Christmas season that she did not have the time or energy to go shopping in the traditional way. This year she vowed she would try an alternative shopping method and purchase ALL Christmas gifts over the Internet. And that's exactly what she did. She found everything she was looking for and more, she saved time, she saved money, she did not have to drive two hours to a mall, she did not have to battle holiday crowds, and everything she ordered was delivered on time and to her doorstep. Her conclusion --- it was the most pleasurable holiday shopping experience she had ever had --- it was the most pleasurable way to shop, period --- and that's the way she intends to shop year-round now.

There's no doubt about it. The way we buy and sell consumer goods is changing -- and it's changing quickly! The reason for the big change can simply be explained with one word, Internet. Estimates indicate that approximately 600 million people are online worldwide. By the year 2005, the global Internet population will reach 1.17 billion. [1] In a report released by the U. S. Department of Commerce, U.S. retail e-commerce, or e-tail, sales for 2003 were 1.6 percent of total retail sales. [3] E-commerce in the U.S. generated \$54.9 billion in 2003, a 26 percent increase over 2002. Research by Forrester stated that e-commerce sales will increase at a steady 19 percent year-over-year rate, rising to \$229 billion in 2008. By 2008, online retail sales will account for 10 percent of total U.S. retail sales.

Why are people buying products over the Internet? A survey of Internet shoppers gave the following reasons [5]:

- Ease of placing an order
- Large selection of products
- Cheaper prices
- Fast service and delivery
- Detailed and clear product information
- No sales pressure
- Easy payment procedure

What are people buying over the Internet? The following product categories are currently selling: [6]:

- Airline tickets
- Hotel reservations
- Computer hardware
- Apparel
- Consumer electronics
- Car rental
- Health/Beauty
- Books
- Music
- Computer software
- Jewelry
- Toys/Video games
- Food/Beverage
- Office supplies
- Flowers
- Linen/Home decorations

- Sporting goods
- Videos
- Appliances
- Furniture
- Tools/Hardware
- Footwear
- Small appliances

What does all this mean to small business? It means the Internet is a new way to expand business opportunities. It is proving to be a great equalizer, allowing the smallest of businesses and those in rural locations to access markets and have a presence that allows them to compete on equal footing. It also means businesses should watch this trend and develop a strategy to position themselves in the new Internet economy. In developing a strategy, first ask, Does the business need a website? and, What does the business want to accomplish by establishing a website? Don't make the mistake of hurriedly creating a website without serious thought and business planning.

Small businesses are using the Internet to create new markets, provide information about products/services 24 hours a day, service customers, get customer feedback, and sell products. Basically, these can be boiled down into three main reasons why businesses establish websites: marketing, customer support, and sales.

Many businesses have sites that create a presence on the web and are what some term a "brochure" site. They serve as an advertising/promotional tool for the business, providing information about the business but not actually selling products online. The Internet has significantly reduced the cost associated with obtaining information about products, and many people use the Internet to research products and then purchase them off line. A website may provide a telephone number and/or fax number for actual ordering. Many companies have found this type of website an effective tool for servicing customers by providing product information and specifications, providing answers to frequently asked questions, and communicating with customers. Some businesses start out with brochure sites and grow into full-service transactional sites.

A full-service transactional website not only creates a web presence, it also is designed for accepting and processing orders online in real time.

Like any other marketing or sales effort, setting up and running a business website will cost money. The cost can range from next to nothing to thousands of dollars, depending on the purpose of the site, size of the site, how much is done in-house, and how much is out-sourced. The bottom line is that a small business with a well thought-out strategy and plan can be doing business online in a short period of time and for a reasonable amount of money.

While the traditional ways of doing business should not be totally abandoned, given current trends and predictions, it is essential that small businesses embrace the use of the Internet as a vehicle for sales. The businesses that position themselves now for a technology-driven future increase their chances of survival.

### **What Do E-Customers Want?**

A true story . . . two years ago a first-time Internet shopper decided to check out amazon.com to see what all the hype was about. While at the site, he had a blast because it was so easy to navigate and he was able to check out books and authors, and read reviews by people just like him. He quickly realized that he literally had access at his fingertips to any book in print. And on top of that, the prices were reasonable! He had so much fun that within 15 minutes he had purchased three books. That same day, amazon.com sent him an e-mail summarizing his order and thanking him for shopping. The next day amazon.com sent him another e-mail letting him know that his

books had been shipped and when to expect them. A few days later, the books were in his hands. The next time he needed a book, it was back to amazon.com. and as the screen popped up, it greeted him with a hello, using his name, and there was even a list of books they thought he might be interested in. He made another purchase, and this time used the 1-click method. In less than two minutes, he had purchased two books. What was all the hype about? A company that puts its customer FIRST in every way!

Do what amazon.com does, and you won't go wrong. Online imitation is not just the sincerest form of flattery -- it's good business. Value the customer above all else. Be customer-centric. Steve Strauss

An important question that needs to be answered before an electronic e-tail website is created is, Who are the people that will be visiting my website? Or, who is my customer or target market? The more you know about your target market, the more you can adjust your website contents. For instance, is the purpose of your website to provide information or to market and sell a product or service? These are two very different objectives and creating a website to address each objective may result in significantly different end products.

Before you start building your electronic storefront, do your homework. Go to the web and look very closely at existing e-tail sites. Evaluate them from a customer standpoint. Here's what customers say they want:

- Clear/accurate product information and representation
- Real-time answers through self-help features and toll-free telephone numbers
- Good prices and clear representation of all charges
- Secure transactions
- Easy to use return/exchange policy
- Quick processing and delivery time
- Elimination of unknowns
- Shopper privacy

A good place to start is with some of the most successful business sites, such as amazon.com and qvc.com. Even if your online business is going to be much smaller in scale than these sites, there are still lessons to be learned from them such as site design from a selling and customer standpoint. In addition, Internet and e-tail customer research can provide guidance in website development. According to a recent report on e-commerce from Forrester [7], exceptional customer service strongly increases future sales through return visits and word-of-mouth. The study showed that 90 percent of satisfied customers are likely to visit again, and 87 percent will tell family and friends about the site. A report by Jupiter [12] said 45 percent of online shoppers choose Web sites based on word-of-mouth recommendations. The Forrester [7] report further indicated that Internet shoppers expect e-commerce sites to have customer service readily available throughout the buying experience.

So when it comes to building an e-tail web store, the question becomes, Precisely what do e-customers want? Internet shoppers want the following:

- Fun and easy to navigate sites -- make the shopping experience at your e-tail site a pleasurable experience by making it user-friendly and easy to navigate. The site should be concise and informative. Potential customers may be reluctant readers, and by encumbering them with volumes of information, you may just encourage them to go elsewhere. Remember the three-click rule: If a customer can't accomplish what he or she wants to do within three clicks, then the system isn't working right. [8]
- Quick download time -- A major complaint among Internet users is long load times. Research indicates that 80 percent of web users cite download time as the number one

problem. [9] Pages should be fast-loading and not keep customers waiting. A couple of seconds is ideal, 10 to 15 seconds is ok, but take more than 20 seconds and your customer is gone. Keep in mind as you design your site that most consumers are connecting to the Internet via slow modems and large graphics increase load times. Recent studies indicate that slow-loading websites cause online consumers to abandon up to 50 percent of online transactions. [10]

- Pages that appear professional -- clean and simple is better than cluttered and complicated. In e-tail, you are selling and your site should be designed to display and highlight what you are selling. The web store should reflect good use of the elements art and principles of design, while at the same time be designed for online shopper usability. Don't get caught up in the latest bells, whistles, glitz, and flash at the sacrifice of service and sales.
- Clear and accurate product information and representation -- since customers cannot actually see, touch, and feel products in person, the graphic representations must be clear and visually accurate. Product descriptions must be thorough and eliminate any guessing. The more clearly and accurately you represent your products on your web store, the less time you will have to spend answering questions about products and restocking returned merchandise from dissatisfied customers.

Another feature that web shoppers find helpful is displaying an in-stock inventory count for products, particularly for items that tend to be in short supply. Shoppers do not want to waste time ordering an item that is not even available. Inventory software is available that can make this an automated function on your website.

- Real time answers through self help features, e-mail, and a toll-free telephone number -- Internet shoppers want answers and they want them quickly. E-mail and the telephone are the most used and the most preferred forms of contact, with e-mail ranking first. In both circumstances, it is key to customer satisfaction that someone be available to answer questions in a timely manner, preferably in real time. Real people providing real time answers add a human touch to doing business. Even online shoppers still prefer doing business with real people. According to a study by Jupiter Communications, 47 percent of people are more likely to buy online with the addition of real time interaction. [11]

However, many Internet shoppers prefer to find the information about products themselves. Provide easy-to-find answers to anticipated questions such as product information, minimum orders, shipping, warranties, and pricing schedules. You must design your storefront so customers can easily find answers to their questions at your site, not your competitors. Offer self-help through the use of searchable databases, online videos, and frequently asked question and answers sections.

Ideally, web-based customer service should include both self help and real time or live help capabilities. [11]

- Good prices and clear representation of all charges -- price is a major factor in closing a sale, so your prices must be competitive. Any additional charges such as shipping, handling, special delivery, gift wrapping, custom or special orders, etc. should be clearly presented to the customer.
- Payment options -- most Internet shoppers want to buy online in real time; however, there are people who prefer to purchase using an alternative method. Offer customers various means of ordering and paying for the items they select. You should offer the visitor

the opportunity to order online, by telephone number (preferably a toll-free number), by fax, or by mail.

- Secure transactions -- customers consistently indicate credit card security is a primary concern when shopping online. Statistics indicate that you lose 50 to 60 percent of potential sales when you don't offer a secure transaction site. Include a statement about your website's security system to help alleviate fears of using a credit card online to make a purchase.
- Easy to use return or exchange policy -- online shoppers want the same or even better return and exchange policies that they are used to receiving in traditional retail. Your return policy should be clearly stated on your e-tail website and should be as liberal as possible given the merchandise you are selling.
- Quick processing and delivery time -- "we want it now" is the motto of Internet shoppers. It is critical that you have a delivery plan and system in place before you go online with your business. Inform customers as to when they can expect delivery at the time they place the order and after they place the order. Send another email message the day the product is actually shipped. Follow-up communication via e-mail is a frequently used and proven model for e-commerce.
- Shopper privacy -- many consumers are concerned about protecting personal information and are leery about how the information they provide at e-tail sites might be used. Consider posting a privacy statement or policy on your website, explaining to customers what information you collect about them and how you use it. Remember that from an ethical standpoint, if you post a policy, it is your responsibility to follow it.

### **Getting Started Building A Web Store**

Usability rules the web. Simply stated, if the customer can't find a product, then he or she will not buy it. The Web is the ultimate customer-empowering environment. He or she who clicks the mouse gets to decide everything. It is so easy to go elsewhere; all the competitors in the world are but a mouseclick away. Jakob Nielsen

As with any business venture, there must be something to sell -- a product, service, or combination of the two. And as with any business venture, the more planning that goes in on the front end, the higher the chance of business success. These same principles hold true for e-commerce, whether it be a new virtual business or an existing business wanting to expand by selling via the Internet.

The information covered in this document provides the basics of how a small business can establish an electronic retail website. This information is intended as a starting point for the many businesses thinking about going online but don't know where to begin. Establishing and maintaining an e-commerce website takes a lot of research, planning, and plain old hard work. However, the rewards can be great!

A small business venture that establishes a website or web store that represents their products AND actually accepts and processes orders online is called a transactional e-tail website. This type of online selling basically requires:

- a domain name/web address
- a web store
  - online product catalog
  - ordering system/shopping cart
  - merchant account/payment processing



- customer communication system
- tracking system
- a web server/host
- site marketing

## Domain Names

Early in the process of setting up an e-tail site, you need to decide on the domain name for the business, which is the name that will be in the URL (universal resource locator). The URL is the web address or location on the Internet for your e-tail website -- [www.yourname.com](http://www.yourname.com). The name you choose is important. It should reflect what you sell and be easy for customers to remember. Once you have chosen your name, the next step is to see if it is available. If the name is available, you need to register it. Domain name extensions most commonly used for business sites include:

- .com - a general domain extension intended for commercial use;
- .net - a general domain extension primarily used for Internet infrastructure organizations/companies;
- .org - a general domain extension primarily used for not-for-profit organizations;
- .biz - a general domain extension intended for businesses;
- .info - a general domain extension intended for both commercial and non-commercial use;
- .pro - a restricted domain extension intended for use by certified professionals and professional entities.

There are free websites that allow you to search domain names and determine if a specific URL has already been registered. For example, the [register.com](http://register.com) and [networksolutions.com](http://networksolutions.com) sites allow you to search domain names to determine if a particular website address has been registered.

If the name has not been registered, you can register the domain name with one of the many registrars (companies that can provide domain name registration services). To view a list of all entities accredited by ICANN (Internet Corporation for Assigned Names and Numbers) to register names in .com, .net, and .org, refer to the ICANN List of Accredited and Accreditation-Qualified Registrars.

Registration gives you the right to a particular domain name for a specified number of years after which it has to be renewed annually. Currently, initial and renewal registrations are available in one-year increments, with a total registration period limit of ten years. Compare the different companies fees and accreditation and use the one with which you feel most comfortable.

According to InterNIC, the Internet domain name system (DNS) consists of a hierarchically organized directory of all the domain names and their corresponding computers registered to particular companies and persons using the Internet. When you register a domain name, it will be associated with the computer on the Internet you designate during the period the registration is in effect.

Registering your domain is a simple process that can be accomplished in a short time, so put your time and effort into coming up with just the right name. You have heard the saying, What's in a name? -- Everything! When it comes to selling on the Internet, this can be very true. Your customers need to know how to reach you without having to think about it. So choose a name and choose it carefully -- think like a customer!

It is important from a business standpoint to have your own unique domain name. Using your company's name or your product's name in your domain name makes it easy for customers to recall and remember the name at a future date. Including additional characters or words in the domain

name only increases the likelihood of customers not being able to accurately recall your complete domain name. Some web hosting services and electronic shopping malls will help you get your site up and going, but your name is embedded within their domain name -- www.theirname/your-name.com. Try to avoid this set up because it is often hard for customers to find your site and hard to build your own web identity.

Another issue to consider is buying multiple domain names or variations of the name you choose. For example, if you were growing and selling all varieties of red roses, a natural choice would be redroses.com. Variations might be red-roses.com, redrose.com, etc. You may also want to consider registering the name as a .com, .net, and .org. That means you have to register (and pay for) each domain name separately. However, from a business standpoint, that is a small investment to protect yourself from lost sales to a competitor who registers a variation of your domain name to draw your customers to their site. If you do register multiple domain names, each domain name can be structured so that it directs the customer to a single website. Registering multiple domain names does not necessarily mean multiple websites have to be developed.

[Note: For more detailed information and answers to frequently asked question regarding domain names, go to the U.S. Department of Commerce's InterNIC, website.]

### *Online Product Catalog*

Your web store is more than just a website -- it must be designed from an e-tail perspective and contain features that make it easy to access and buy products. First it needs to contain an online product catalog that offers good quality and accurate graphic representation of each product you are selling. This is fundamental to selling on the web. Remember that customers cannot touch and feel your products, they can only see what is up on their screen, so products must look good and make customers want to buy them. (Many businesses that are already selling via mail order catalogs are a natural for selling on the web. They already have a print catalog that they can adapt to a virtual catalog as well.)

Keep in mind that download time for any website should be quick. Internet shoppers are impatient and don't want to wait more than a couple of seconds. Keep your graphic files as small as you can without distorting your product images. Many sites use small graphics that when clicked, open to a larger view of the product.

### *Ordering System/Shopping Cart*

Incorporate an ordering system that is easy to use to allow customers to pick and choose the products they want to order from your online catalog. To date, the most successful online shopping model is the shopping cart ordering system. The electronic shopping cart is modeled after the way most of us shop for groceries in the United States -- with a cart that we fill with products as we push it around the store. The online shopping cart system allows customers to place items they choose into their own personal virtual shopping cart. When online customers are through shopping, they then proceed to check-out where items are totaled, including shipping/handling and any other charges. If you are building your own web store, there are many software packages available that utilize the shopping cart model. Shopping cart software ranges in price from free to thousands of dollars depending on the quality and functionality. Look for a fully integrated software package that takes the process all the way from product selection to order total.

### *Merchant Account/Payment Processing*

Many online businesses have had difficulty establishing a "merchant account," a special type of bank account that holds the proceeds from credit card transactions. Without a merchant account, web businesses can't accept credit cards and may miss out on more than 60 percent of their sales

opportunities. David Johnson

Currently, credit cards are the quickest and most efficient way to accept payment for online purchases. The two ways for accepting credit cards for online purchases are manual processing and real time processing. In manual processing, the online customer enters the credit card number for payment of purchase. The information is sent to you and the transaction is processed by hand with a terminal keypad. You enter the numbers into the terminal where it then connects to a processing network and returns the status as approved or declined.

In real time processing, the customer enters the credit card number and the transaction is processed entirely online. After the transaction has been completed, the processor will deposit the money from the transaction into your bank account. The process for accepting real time credit card payment via the Internet requires communication between your web store shopping cart and payment processor using your merchant account. It is critical that these functions are compatible with one another.

Either way, you need to set up the ability to accept credit card payments online by establishing a merchant account and a way to process payments. There are many services set up to do this for small e-tail businesses. Go to a search engine and type in "merchant account" and a long list of merchant account and processing service providers will come up. Compare and evaluate companies in terms of costs (set-up fee, per transaction fee, percentage of sales, monthly/annual fee), secure transactions, how long they have been in business, compatibility with your system, and the services they provide (an impartial listing of merchant account providers can be found at [MerchantWorkz.com](http://MerchantWorkz.com)). It is easiest and simplest to go with a fully integrated service that provides you with the merchant account and payment processing at a secure location; however, this can be more expensive.

From a customer standpoint, having a secure site where they actually submit their credit card number is critical. This is done by using a SSL (Secure Socket Layer) secure server where the transactions take place. Insuring secure transactions is currently the number one customer issue when it comes to buying online. Experts say that you lose 50 percent to 60 percent of potential sales when you don't have a secure transaction site.

#### *Customer Communication System*

In addition to an ordering system, your web store needs to incorporate a way to communicate with customers. There should be a telephone number on each web page where customers can call with questions and there should be an easily accessible e-mail system where customers can send questions. A recent study by Forrester indicated e-mail and the telephone were the most-used and the most-preferred form of contact, with e-mail ranking first. In both circumstances, it is key to customer satisfaction that someone be available to answer the questions in a timely matter --- within 24 hours or less. Remember, your competition is just a click away!

The communication system you incorporate should have a mechanism that e-mails customers once they have placed an order, thanking them and letting them know when to expect shipment. The customer database can also be used to send customers information about new products, sales, etc. This communication system should be as automated as possible.

#### *Tracking System*

In addition to a communication system, the web store should incorporate a system that tracks each customer order from placement through delivery.

## *Web Server/Host*

Once your e-tail website is designed and ready to go, you must have a place for it to reside, or an ISP (Internet Service Provider) to host it. The two basic choices are to purchase your own web server or “rent” space on a web server. The key word here is web server -- not just any server will do. The first choice, buying your own server, can be costly both in initial hardware and software and in maintaining the system. If you don't have the necessary skills, you will have to hire someone to set up and maintain your server for you, and that can be quite expensive. Most small businesses choose to rent space on a server. Either way, you will pay a monthly fee to an ISP to host your site or your server. It is important to start locating the ISP while you are working on your web store. Don't wait until you have your web store done. Make sure that the service provider has adequate space, bandwidth, reliability, knowledge, and capability to handle a transactional e-tail website.

## *Outsourcing and Web Building/Hosting Services*

Many e-commerce solutions providers have teamed up with ISPs and Web hosting services, a trend that is certain to make it very easy for you to find a one-stop solution for doing business on the Internet. These new partnerships often combine site hosting and store set-up and credit card processing into a single package specifically designed for e-commerce beginners. E-Commerce-Times

At this point, if you have decided that you do not have the time, talent, staff, or inclination to build your e-tail website in-house, then do what many small businesses do and out-source it to a company or person with expertise in building websites. Make sure that whoever you hire not only knows how to build websites, but they also know how to build e-tail websites. There is a lot more to building a site for doing commerce on the Internet than building a personal web page or an informational web page for a business. Always take an online look at work they have done and evaluate it before you hire someone for your business. The cost to out-source your website design will vary from a couple hundred dollars to thousands of dollars depending on the complexity of site, size of site, who you hire, and what you want done.

Another option -- what some call the “one-stop” method of getting an e-tail website up and going for minimal costs and in minimal time -- is to use a web building/hosting service. These are services that take you through the entire process of setting up your web store starting with securing your domain name and going all the way through the marketing of the site. These companies provide templates for designing your web store, shopping cart software, forms, a place to host your site, a source for setting up a merchant account and processing, secure transaction locations, and more. Go to a search engines and type in “web hosting service” and a long list of web hosting service providers will come up. Compare and evaluate companies in terms of costs, services they offer, and ease of use. This is a real option for many small businesses, especially those companies that don't have a large number of different products to sell, have a small budget dedicated to this effort, or just want to start out on a small scale.

## **Design and Technical Considerations**

There are many design and technical issues that need to be considered when designing a website. The more knowledge you have before building your site, the better your site will be. The following are some of the more critical issues to consider:

- Bandwidth -- bandwidth affects the speed with which a user can access the Internet. The dominant design criterion should be download speed in all web projects until about the year 2003. [5] Design your website for the masses aiming at optimal usability over a 56K modem. Apply the KISS rule to your website -- Keep It Short and Simple! The more you use large graphics, animation, video streaming, audio streaming and other multime-

dia design features, the slower the download time. Recommendations are to keep page sizes (file sizes) below 34K to prevent loss of viewers. [5] Internet customers don't like to wait!

- **Browser Compatibility** -- design your website so that it looks good on all browsers. What looks OK on Netscape might not look OK on Internet Explorer or AOL browsers. And what looks OK on Netscape 4.0 might not look OK on Netscape 3.0.
- **Color Palette** -- color configuration varies from computer to computer from multi-million color displays to 256-color and 16-color monitors. For consistence in graphical appearance, it is recommended using a 256-color/16-color default in your web design.
- **Continuity** -- the overall look of the website should be consistent from page to page. There should be a unified look and feel as the user navigates within the site. Pages should incorporate similar layout, logos, fonts, colors, styles, graphics, etc., creating a comfort factor and a sense of familiarity with customers.
- **Frames** -- avoid using frames in the design of your site. Frames decrease the dynamic space you have to work with, thereby decreasing the amount of space for featuring products. They often present navigation problems for the user, some browsers cannot print framed pages accurately, and search engines have trouble with framed sites.
- **Home Page** -- the most prominent design element on the home page should be the name and logo of the company. They should also appear in smaller scale on every page of the website. In addition, a business website should provide customers with a brief description of the business and available products. Briefly describe any unique aspects of your business from inception to the current operation to include unique manufacturing, service, distribution, and other processes. This type of seemingly useless information provides your company the opportunity to differentiate itself from competing products. Be careful not to overdo it; too much seemingly useless information may actually become useless if you cannot retain the customer's interest.
- **Navigation** -- use directories, site maps, and navigation bars throughout your site. Be consistent in your format from page to page. The goal is to enable customers to move around your site with ease. No matter where a customer is on the site, they should be able to get wherever they want to go quickly. According to an internetday.com article 20 to 40 percent of users don't purchase because they can't figure out how to easily move around the website.
- **Page Width** -- do not design for a specific screen width. Experts recommend creating page layouts that will work across a range of window sizes -- a resolution-independent page which can adapt to various screen sizes. However, if this is not possible or you do choose to design for a specific size, at least for the immediate future stay with the current standard page size of 800 x 600 pixels. Currently, about 93 percent of the web population can view a page at 800 x 600 without unnecessary scrolling. [13] Taking into account the actual viewable browsing area, this means you would design pages that are about 770 x 430.
- **Readability** -- design your site so that it is easy to read. The background should not impair the visitor's ability to read and see the information on the page. Use colors with high contrast between the background and text. For example, a black background with dark blue text can make reading extremely difficult. Don't use patterned backgrounds that interfere with the ability to read information and see products. Use fonts that people can see and read easily. Be brief, concise, and succinct in your writing. Make your words

count. Use short paragraphs and bulleted lists. The rule of thumb when writing for the web is to reduce by 50 percent the amount of text used to write the same material for print.

- Screen Compatibility -- screen size and resolution vary from user to user. Design your website so that it will look good on all screen sizes and screen resolutions.
- Text Only Default -- ten percent of Internet users are using text-only browsers. A well-designed website will include a text-only option that will display alternate information for browsers without graphics capability. In addition, a text-only version of your site makes it easier for visually-impaired users to access your information with a talking browser that reads the text aloud.
- Accessibility -- a website should be designed so that it is accessible to people with disabilities. For example, consider the following design issues that affect Web site accessibility:
  - The visually impaired use special readers that read only text.
  - Blinking text can trigger seizures in some visitors.
  - Poor color choices may render text unreadable to color blind visitors.
  - Mouse-dependent site navigation can be difficult for visitors with physical limitations.
  - Information contained in sound clips is inaccessible to hearing-impaired visitors.
- Bobby is a web-based tool that analyzes web pages for their accessibility to people with disabilities. The Center for Applied Special Technology (CAST) offers Bobby as a free public service in order to further its mission to expand opportunities for people with disabilities through the innovative uses of computer technology. To analyze your web site, go to [www.cast.org/bobby](http://www.cast.org/bobby) and type in the URL of the page that you want Bobby to examine and click submit. Bobby will display a report indicating any accessibility and/or browser compatibility errors found on the page. Additional information regarding accessibility for the disabled is available through the Web Accessibility Initiative (WAI).
- User Interface -- a website must be easy to use, period. Ease of navigation is critical. And the easier and more logical you make this process on your site, the happier the user will be. Navigation interfaces need to help customers answer three fundamental questions relative to the web as a whole and relative to the site's structure [5]:
  - Where am I?
  - Where have I been?
  - Where can I go?

There are several excellent books on the market that address these issues and more:

Collaborative Web Development: Strategies and Best Practices for Web Teams  
Jessica R. Burdman

Designing Large-Scale Web Sites: A Visual Design Methodology  
Darrell Sano

Designing Web Usability: The Practice of Simplicity  
Jakob Nielsen

Information Architecture for the World Wide Web

Louis Rosenfeld and Peter Morville

Designing Large-Scale Web Sites: A Visual Design Methodology  
Darrell Sano

Web Concept & Design: A Comprehensive Guide for Creating Effective Web Sites  
Crystal Waters

## **Site Marketing**

So the storefront is open, the banner is flashing, the products are ready, but the cart is still empty. What to do? How do you get customers to your site? Don't despair. There are many ways to drive eyeballs to your new e-commerce site. Steve Strauss

"Build it and they will come!" They may, and then again, they may not. You must put some effort into marketing your e-tail web store. Many companies are not satisfied with their website as a marketing and sales tool. It is not unusual for a business to expend significant resources constructing a professional website only to leave it unattended. To make your website work, it must be a critical part of your marketing plan and receive the same attention other components receive. The website needs to be updated periodically and marketed continually to be successful. There are millions of websites on the Internet, and without rigorous marketing, the chances of your site generating the desired level of customer traffic and/or sales is quite small. The key is to get your site known so potential customers will come and take a look. There are several things that you can do to increase the hits on your site.

Submit your site to the "big 3" search engines (alltheweb, alta vista, and Google), and the Yahoo! directory. You need to be listed with the search engines because this is the number one way people find sites selling products they are interested in purchasing. It is estimated that 85 percent of all web users find sites via search engines [7]. To submit your site, go to the main page of the search engine and click the button for site submission. For example, yahoo.com has a "How to Suggest a Site" link at the bottom of their page that takes you to a page of instructions on how to do it.

When you submit your URL to search engines, don't expect your site to show up immediately. Some search engines take a while before your listing shows up. A month or so after submitting your URL to search engines and directories, check to make sure it is listed properly. Some search engines and directories have links that allow you to verify that your website has been registered. Don't stop there; it is important to frequently check on your website pages as pages sometimes disappear, dead links may develop or the page may be deleted from a search engine or directory catalog.

For optimal indexing of your website by search engines, Dr. R. F. Wilson of Web Marketing Today recommends the following:

- Write a Page Title. Write a descriptive title for each page of five to eight words. Remove filler words from the title, such as "the" and "and." This page title appears on the Web search engines when your page is found. Entice surfers to click on the title by making it a bit provocative. Place this at the top of the Web page between the <HEADER></HEADER> tags, in this format: <TITLE> Web Marketing Checklist -- 26 Ways to Promote Your Site </TITLE>. Hint: use some descriptive keywords along with your business name on your home page. Instead of "Acme Cutlery, Inc." use "Acme Cutlery -- Pocketknives, Butchering Sets, and Kitchen Knives." The more people see in the blue highlighted portion of the search engine that interests them, the more likely they are to click on the link.

- List Keywords. To get your juices flowing, sit down with some associates and brainstorm a list of 50 to 100 keywords or keyphrases -- the kind of words or phrases someone might search on to find a business or site like yours. Then refine the list to the most important 20 or so. Place those words at the top of the Web page, between the <HEADER></HEADER> tags, in a META tag in this format: <META NAME="KEYWORDS" CONTENT="promoting, promotion, Web marketing, online sales ... ">. Note, however, that some research on search engine algorithms indicates that a fewer number of keywords may help you better target the most important search if you're working to increase your page's ranking on the search engines. Consider using both lowercase and capitalized forms of your most important words, since some search engines are capitalization-specific. Make sure you don't repeat any word more than three times so you're not penalized for "keyword spamming."
- Write a Page Description. Select the most important 20 keywords, and write a careful 200 to 250 character (including spaces) sentence or two. You don't need to repeat any words used in the page title. Keep this readable but tight. Eliminate as many filler or throwaway words as you can (such as: and, the, a, an, company, etc.) to make room for the important words, the keywords which do the actual work for you. Place those words at the top of the Web page, between the <HEADER></HEADER> tags, in a META tag in this format: <META NAME="DESCRIPTION" CONTENT="Increase visitor hits, attract traffic through submitting URLs, META tags, news releases, banner ads, and reciprocal links">.
- It is important to resubmit a web page after major changes have been implemented. By resubmitting the page, search engines and directories have the opportunity to index your new page. The new index may significantly impact your search engine results ranking or place the page in another category. Resubmitting a website after significant changes have been made is one way to ensure that your site's content is current within the various search engines and directories.

[Note: The following websites have excellent information on the subject of web marketing via search engines, meta tags, etc. -- [searchenginewatch.com](http://searchenginewatch.com), [searchengines.com](http://searchengines.com) and <http://home.eol.ca/~lillyb>]

Reciprocal linking and cross promotion -- if you provide a link to my site, I will provide a link to your site -- is another way to increase traffic to your site. This takes full advantage of the way the web works. It is well known that word of mouth is a powerful form of advertising. With the web, verbal referrals are replaced with links or click referrals. A recent study by Forrester showed that 90 percent of satisfied online customers are likely to visit again, and that 87 percent will tell friends and family about the site.

Affiliate programs are becoming an extremely good way to generate traffic and revenue. An affiliate program works like this: You sign up to become an affiliate of a company (for example, [amazon.com](http://amazon.com)) on the web. Once you become an affiliate and provide a link to their site, any time someone visits them via your link and makes a purchase, you receive a percentage of the sale. It costs you nothing to do this, and you can use an affiliate program to promote your own site. You would give affiliates a percentage of sales they generate by linking customers to you. Tracking is crucial to affiliate programs, and you would have to incorporate such a system into the design of your site if you go with this type of program.

Advertisements are another way to increase traffic and to generate revenue. You can purchase ad space on sites that receive a lot of traffic, hoping to capture potential customers to your site, or you can sell ad space on your site to others. Don't forget to include your URL or web address



with your traditional forms of advertising and on all collateral business material such as radio, television, print, business cards, brochures, stationary, fax cover sheets, invoices, quotes, etc. [www.yourname.com](http://www.yourname.com) should be highly visible in all aspects of your business. Including your Web address on all business material allows you to expose current and potential customers to your address. The key is to get your Web address in front of as many people as possible.

### **The Bottom Line**

The bottom line in business is, of course, profit -- and profit from e-tail is achieved by:

- getting customers to come to your site,
- getting customers to make a purchase once they get to your site, and
- getting customers to return to your site and purchase again, and again, and again!

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[5] Dr. Jakob Nielsen - [www.useit.com](http://www.useit.com)

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[7] Forrester - [www.forrester.com](http://www.forrester.com)

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# Growing Shiitake Mushrooms

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Oklahoma Cooperative Extension Fact Sheets  
are also available on our website at:  
<http://www.osuextra.com>

## Introduction

Shiitake is an edible mushroom that grows on wood from a variety of tree species. Due to its ease of cultivation and its pungent flavor, Shiitake is being considered as an alternative crop in many areas of the United States. Shiitake have been used in the Orient for about 2000 years, but have only been commercially cultivated since 1940. About 160,000 metric tons are produced annually in Japan, half of which is dried and exported. It represents a two billion dollar industry which employs about 200,000 people.

In the United States, shiitake is used in oriental restaurants and is often sold in oriental, gourmet and health food stores. Over \$15 million of Japan's shiitake mushroom production during 1984 was exported to the U.S. The demand for Shiitake is increasing as consumers are being introduced to the mushroom which is more chewy, aromatic and flavorful than the common button mushroom. Over 2.1 million pounds of shiitake was produced in this country during 1986 and nearly 3 million pounds in 1987.

As an alternative enterprise in the United States, Shiitake represents a way to utilize a forest resource that, in many cases, is considered a weed. Growing Shiitake involves utilization of low quality hardwoods; trees of small diameter (three to six inches) that normally are either left in the woods after conventional logging, cut and sold as low-value pulpwood, harvested as firewood, removed as competition or left as unproductive land. Utilization of this resource would also present opportunities for small woodlot improvement.

Much of the shiitake production in the U.S. occurs in Virginia, Ohio, Pennsylvania and California. Growers range in size from small operations of a few logs to large corporations with hundreds of thousands of logs. In Oklahoma, low quality hardwoods, suitable for shiitake production, cover millions of acres throughout east and central Oklahoma. Currently, there exists only a few shiitake producers in Oklahoma who are experimenting with different strains and production methods.

## The Production Process

### Obtaining Suitable Logs

Selecting the best available tree species is the first step to successfully growing shiitake. Shiitake mushrooms have been reported to grow on red and white oaks, chestnut, ironwood or hornbeam, alder, aspen, poplar, cottonwood,

beech, birch, sweetgum, and pecan. There is general agreement that oaks work well, especially those in the white oak group. In Oklahoma, both white oak (*Quercus alba* L.), post oak (*Quercus stellata* Wangerh.) and sweet gum (*Liquidambar styraciflua* L.) represent the preferred species.

Logs should be cut from living trees free of any decay. Trees should be harvested during the dormant or winter season when the wood contains the maximum amount of stored carbohydrates. In Oklahoma, this would usually be from November to March. Log diameters should be from three to six inches while log lengths should be from three to five feet. During log cutting it is important not to damage the bark layer.

Log length is not a critical concern and should be determined mainly on the basis of the most manageable length. Log diameter is more critical. Logs smaller than three inches in diameter can dry out very quickly. Although smaller dimension logs will produce mushrooms more quickly, they will tend to decompose more rapidly. Logs greater than six inches in diameter can produce mushrooms over a longer period of time but require more inoculations to compensate for the greater diameter. They also may take longer to produce the first crop and have increased chances for becoming contaminated.

There have been many recommendations concerning log storage or curing. In general, if inoculation is not planned soon after making logs, then trees should be left tree length until shortly before inoculation. Traditional log curing has been from one to two months. However, many growers are cutting logs and inoculating as soon as possible to take advantage of the higher moisture content of trees immediately following felling. Generally, inoculation should occur within two weeks of felling a tree.

### Obtaining Shiitake Spawn

A mushroom is a reproductive structure of a fungus plant which produces spores. When a spore lands in a favorable environment, such as a log, it will germinate, sending thread-like filaments called hyphae into the log. The hyphae breaks down the log as it grows and after a period of time, usually at least six months, the fungus will begin to produce mushrooms. Spawn, which contains active hyphae, is the way shiitake producers introduce the fungus into the log.

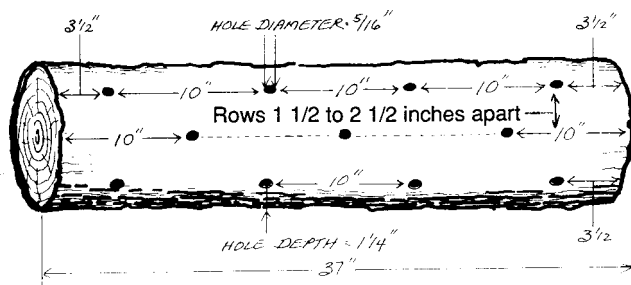
Spawn comes either as wooden plugs made from hardwood dowels or as sawdust. Many strains of shiitake are available and can be classified as cold weather, warm weather, or wide-range depending on when they produce mushrooms.

Most growers, unless they have some training in microbiology, purchase new spawn each time they inoculate logs. When ordering spawn, it is suggested that at least two strains of spawn be used. In Oklahoma, growers should consider a cold weather strain for growth in the spring or fall and a warm weather or wide-range strain for summer. Due to the lack of information, specific recommendations about strains for Oklahoma can not be made. Growers should experiment with several different strains of spawn from more than one supplier.

A new type of spawn called "comb spawn" has been developed in Japan but is not generally available in the United States. It is a wafer which has been cultured with spawn and inserted in a thin saw kerf in a log. It is reported to reduce the total time and labor needed for inoculation.

### Inoculation of Logs

Inoculation is placing the spawn into the logs so that the shiitake fungus can grow through the wood. Holes are usually drilled into the log, filled with spawn, and then covered with wax or other material to seal in moisture and protect against contamination. Holes for plug spawn should be 5/16 inch in diameter and 3/4 to 1 inch deep (Figure 1). Plugs are inserted into the logs and usually hammered flush with or just below the surface of the log. Sawdust spawn holes are generally wider and deeper being 3/8 inch in diameter and 1 1/4 inch deep. Sawdust spawn is packed by hand or by special injector into the drill holes. Better colonization by the sawdust spawn as compared to the plug spawn may reduce inoculations per log, but the sawdust spawn is more difficult to handle and you must be careful not to let the spawn dry out.



**Figure 1. One possible technique for preparing logs for inoculation**

Holes should be staggered evenly around the log. Rows running the length of the log are spaced 1 1/2 to 2 1/2 inches apart. The holes within a row should be spaced six to ten inches apart and alternating with the holes in the adjacent row. Heavier inoculation will accelerate the growth of the fungus within the log but also represents additional investment.

Other inoculation techniques include a variety of chain saw cuts. For short logs no more than two feet in length, a 1/2 inch thick wafer can be cut from each end of the log and a layer of sawdust spawn applied to the end. The cut wafer is then nailed back to the log. Another method is to space three to four chainsaw cuts, 1/3 of the way into the log, along each face of the log. The cuts are filled with spawn and sealed with melted paraffin. In combination with this method spawn can also be applied to the end of the log and covered with aluminum foil. Wedge cuts about 1 1/2 inches deep have also been used where spawn is applied to the cut and the wedge replaced and secured by thin plastic tape around the log.

### Incubation of Logs

Mushrooms will be produced after the shiitake fungus colonizes the log. The first "fruiting" will normally occur from six to eighteen months after inoculation and will depend on the strain, the inoculation rate, the incubation conditions and tree species. Monitoring and maintaining environmental conditions during the incubation period is a critical point in the production process.

During the first two months logs should be stacked closely to help maintain a high moisture content. Shiitake grows best when the moisture content of the wood is at least 35 to 45 percent. Growth becomes poor when the moisture content falls below 35 percent or rises above 60 percent. When the moisture content becomes low the log should be soaked or continuously watered for 48 hours. Following watering, good air circulation is needed to keep the surface of the logs dry to prevent contamination. The optimum situation is when the bark remains dry but the inside remains moist.

Shiitake spawn will grow between 40 and 90 degrees Fahrenheit but the optimum is 72 to 78 degrees Fahrenheit. Stacking logs under a canopy of trees or shade cloth which provides 60 to 70 percent shade helps to maintain moisture content while preventing the logs from becoming too warm. If the logs dry out or overheat the shiitake fungus can be killed. Common stacking methods include the X pattern and the crisscross pattern (Figure 2). On hill slopes the lean-to pattern can also be used effectively. Logs should be checked periodically and turned or restacked to keep the moisture content evenly distributed. Log moisture content can be monitored by including several logs of known dry weight and periodically weighing them to determine their moisture content.

### Mushroom Fruiting

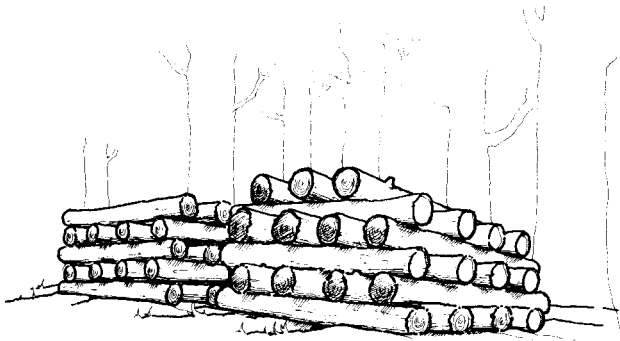
Natural fruiting of shiitake occurs under prolonged cool, moist conditions. It will usually occur within two weeks of a natural rainfall. Fruiting can be induced by soaking the logs in cool water for one to three days. Soaking time will vary depending on the difference between water and air temperatures. In general, the greater the temperature difference, the less soaking time is needed. Soaking temperatures will also vary by strain and growers should check with suppliers for details.

Traditionally, the logs will produce mushrooms in both the spring and the fall, although the fruiting period may be extended in the winter by placing the logs indoors. Many growers restack the logs during the fruiting period using the X pattern. The fruiting area should have slightly more light and air movement than the spawn-run area but still be protected from winds and direct sun. Once logs begin to fruit, they will normally produce mushrooms one to several times a year for up to six years.

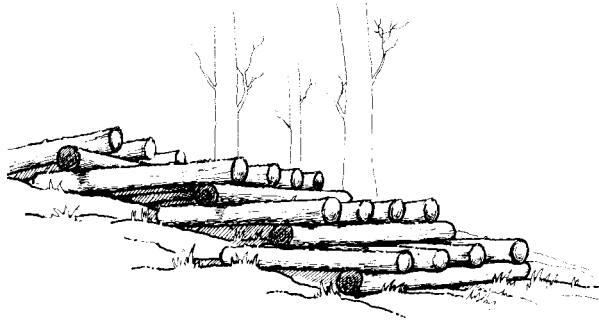
Shiitake can also be grown under greenhouse conditions. By controlling temperature and humidity conditions, logs can be forced to produce during the winter and summer when outside logs are not fruiting. These producers can take advantage of the best markets. Some experienced growers also grow shiitake on substrates other than logs. These include logs made from sawdust and other agricultural waste products such as wheat straw and corn stalks and cobs.

### Harvesting, Storage, and Marketing

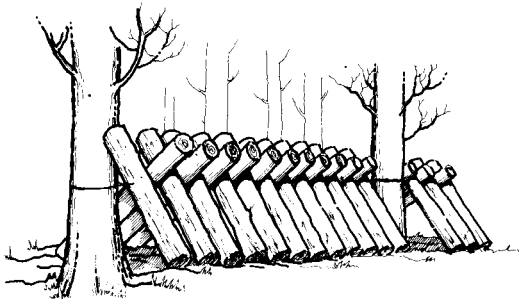
Mushrooms should be harvested on a daily basis, usually in the afternoon when the mushrooms are dry. Mushrooms are removed from the log by twisting or cutting at the base



Criss-Cross Method



Stacking Method on Slope or Hill



X Pattern Method

**Figure 2. Common stacking methods.**

when they have opened about 60 to 75 percent. They should be put immediately into cardboard boxes and refrigerated. Refrigeration can extend the shelf life of shiitake from four to five days to up to 2 or 3 weeks. Mushrooms should be shipped to market within 5 days of harvest but preferably sooner.

Mushrooms of lower quality or freshness can be dried, packaged and sold in retail and restaurant markets. Shiitake dry easily and reconstitute very well, so marketing by mail is also possible. Drying can be accomplished by placing the mushrooms over dry, warm air, preferably in sunlight which increases their vitamin D content. Under artificial drying, gentle heat of 90°F is gradually increased to 140°F over a 10 to 14 hour period. Seven pounds of fresh shiitake yields about one pound of dried mushrooms.

For most growers, direct, local marketing is probably the best marketing option. Many people are still unaware of this

mushroom as a new food option. In most cases, some education about the qualities of shiitake will be required. Marketing cooperatives may be a viable option in the future for smaller producers.

## Costs and Returns

Costs can vary greatly depending on raw material, equipment used, efficiency and costs of labor and practices implemented. Potential growers should also carefully consider the possible financial returns and risks in shiitake production. The following is an example of an outdoor operation in which 4,000 logs are inoculated each year (Baughman, 1989). However, growers are reminded that they should perform their own financial analyses to reflect their specific cash-flow situation. Assumptions for the following analyses are as follows. The scenario has a 15 year planning period for which inoculations cease in the twelfth year. Logs were assumed to fruit twice each year starting the year after inoculation. Over a four year period, a 16 percent loss in the number of logs inoculated is assumed (Table 1). Each log produces 3.06 pounds of mushrooms over the four year period.

A detailed description of assumptions for the cash-flow analysis is provided below. All cash flows were assumed to occur at the beginning of the year. The cash flow analysis (Table 2) is provided mainly for the reader to understand the components of an outdoor shiitake operation. Under the assumptions of the example, after-tax yearly net revenue becomes positive in year 3 of the operation, while after tax cumulative net revenue becomes positive in year 5. This reflects the up front equipment costs. Annual profit reaches a maximum in year 13 at \$43,279, while the total profit for the 15 year period is \$307,309. The reader is reminded that these figures change with any modification of assumptions.

## Operating Expenses

### Log covers:

- Plastic— .25 sq. ft./log @ \$0.018/sq. ft., 3 yr. life.
- Fabric— 1 sq. ft./log @ \$0.10/sq. ft., 4 yr. life.

### Tools/supplies:

- Sawdust spawn inoculation tool— 1/4000 logs inoculated @ \$22 ea.
- Staple gun— 1/12000 logs inoculated @ \$20. ea.
- Log drilling stands— 1/4000 logs inoculated @ \$17 ea.
- Electric drill—1/6000 logs inoculated @ \$210 ea.
- Drill bits—\$36/4000 logs inoculated.
- Electric extension cord— 1/8000 logs inoculated @ \$18 ea.
- Wax melting pot— 1/8000 logs inoculated @ \$40 ea.
- Wax baster— 1/4000 logs inoculated @ \$34 ea.
- Water hose & sprinkler head— 1/4000 logs on site @ \$35 ea., 4 yr. life.
- Scale for weighing logs— 60# capacity milk scale @ \$100.
- Picking & storage baskets for mushrooms— \$2/1000 lbs. mushrooms.
- Laying yard maintenance materials— 5% of original materials cost/yr.
- Steel racks for carrying and soaking logs— 1/25 logs soaked @ \$4 ea.
- Office supplies—cost estimated for small tools, paper products, telephone service.
- Tractor operation & maintenance— \$0.02/log on site/yr.

### Utilities:

- Outdoor operation— water & electricity @ \$0.14/log on site/yr.

**Advertising:**

\$0.30/lb. of mushrooms with expenses weighted to beginning of project. 33% of total expense occurring in first 3 years. Remaining expense spread evenly over next 12 years.

**Shipping:**

Packaging & labels— \$0.25/lb. of mushrooms.  
Transportation— \$0.50/lb. of mushrooms.

**Interest on borrowed money:** 11%/yr. based on cumulative net loss.

**Capital Expenses****Logs:**

Oak logs purchased @ \$0.50 ea., 6" diameter by 40" length.  
Spawn @ \$0.90/log.  
Wax @ \$0.03/log.  
Aluminum identification tags and staples @ \$0.05/log.

**Soak tank:**

Concrete vault, each log being soaked occupies 1.25 cu. ft., total capacity assumes logs to be fruited during one week are all soaked at same time, double capacity provided in case extra logs must be fruited to satisfy short term need.

**Laying yard:** (for laying and fruiting outdoors)

.8 sq. ft. ground space/log, shade cloth over top and on two sides @ \$0.20/sq. ft., wooden poles @ \$9 ea. and steel cables @ \$0.14/ft. hold up shade cloth, poles 12 feet apart on perimeter and approximately 24 feet apart on interior, perimeter poles held down by cable and buried deadman @ \$3.00 ea., cable clamps & thimbles @ \$0.70/set and screw eyes @ \$0.30 ea. fasten cables to poles and deadman, construction tools @ \$100.

**Tractor:**

Used farm tractor with front end lift @ \$5,000, 7 yr. life.  
Trailer for transporting logs @ \$500, 7 yr. life.

**Refrigerator:**

.41 cu. ft./lb. of mushrooms, holds all mushrooms fruited in one week.

**Scale for weighing mushrooms for sale:**

Electronic, digital readout @ \$595 ea., 6 to 7 year life.

**Revenue****Price:**

All mushrooms sold fresh.  
\$4.50/lb. of mushrooms produced.

**Advantages and Disadvantages****Advantages**

1. Shiitake can represent a supplemental income source to the landowner with low initial costs compared to other food enterprises.
2. Producing shiitake represents a way to utilize low quality hardwoods, an otherwise under-utilized resource. It can be integrated into conventional timber management practices.
3. The market for shiitake mushrooms is growing.

**Disadvantages**

1. Similar to other alternative enterprises, shiitake requires some time and effort to produce.
2. Production can be risky due to problems with low quality spawn, competing wood-rotting fungi, molds, termites, insects, and variable weather patterns.
3. The market for shiitake is not well developed and may require some education of the consumer. Price adjustments may be expected as more producers enter the marketplace.

**Conclusion**

Production of shiitake mushrooms represents a possible alternative enterprise for farmers and landowners in Oklahoma. As an alternative enterprise it has a high degree of risk. The future market is optimistic although any new producers will have to invest considerable time in developing the market. Very few yield studies have been completed in the United States but attempts to analyze the economics of shiitake production are optimistic about potential profits. Growers should begin on a small scale to experiment with different strains, inoculation techniques and incubation methods.

**Table 1. Outdoor production: Log losses and mushroom yields for 4000 logs on a four year cycle.**

Year	Logs		Mushrooms			
	Number at Beginning of Year	Percent Loss <sup>1</sup>	Number Fruiting	Percent of Total Yield	Pounds Per Log	Total Pounds
1	4000	10	0	0	0.00	0
2	3600	3	3600	18	.54	1944
3	3492	3	3492	47	1.44	5028
4	3387	0	3387	35	1.08	3658
Total		16		100	3.06	10630

<sup>1</sup> Loss is assumed to occur at end of year.

**Table 2. Cash flow for outdoor shiitake production.**

ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Costs: <sup>1</sup>															
Tools/supply	1390	1017	980	1508	1613	1352	1770	1817	1600	1909	2041	1710	751	654	542
Utilities	560	1107	1680	2280	2371	2466	2565	2667	2774	2885	3000	3120	2349	1603	821
Advertising	4252	4422	4599	2393	2488	2588	2591	2799	2911	3027	3148	3274	3405	3542	3683
Shipping	0	1516	5656	8969	9327	9700	10088	10492	10912	11348	11802	12274	12765	10848	4752
Interest	2474	4013	2657	0	0	0	0	0	0	0	0	0	0	0	0
Logs	5920	6157	6403	6659	6926	7203	7491	7790	8102	8426	8763	9114	0	0	0
Soak tank	3145	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laying yard	1726	0	1867	0	0	0	0	0	0	0	0	0	0	0	0
Tractor	5500	0	0	0	0	0	0	0	72380	0	0	0	0	0	0
Refrigerator	0	6850	0	0	0	0	0	0	0	0	0	0	0	0	0
Scale	0	619	0	0	0	0	0	7830	0	0	0	0	0	0	0
Revenue	0	9098	33934	53808	55960	53199	60527	62948	65465	68084	70807	73640	76585	65083	28505
Before Taxes: <sup>1</sup>															
PERIOD NET REVS.	-24967	-16604	10092	31999	33235	34890	35921	29361	39167	40489	42052	44147	57315	48435	18707
CUM NET REVENUE	-24967	-41571	-31478	521	33755	68645	104566	133928	17395	213584	255636	299783	357098	405533	424241
After Taxes: <sup>2</sup>															
PERIOD NET REVS.	-21570	-13390	7769	23976	24626	25730	26474	19681	28953	29608	30694	32021	43279	35741	13817
CUM NET REVENUE	-21570	-24960	-27191	-3214	21411	47141	73615	93296	122250	151857	182451	214472	257751	293492	307309

<sup>1</sup> All values are in dollars inflated at 4 percent to year of occurrence, before taxes. Columns may not add due to rounding error.

<sup>2</sup> All values are in dollars inflated at 4 percent of occurrence, after taxes. Columns may not add due to rounding error.

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# The Oklahoma Cooperative Extension Service

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The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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# Growing Mushrooms Commercially — Risks and Opportunities



Danny L. Barney

People have harvested mushrooms from the wild for thousands of years for food and medicines. Of the estimated 1.5 million species of fungi, about 10,000 produce the fruiting bodies we call mushrooms. While commercial harvesting of wild mushrooms continues today, most of the world's supply comes from commercial mushroom growers. The Chinese first cultivated shiitake (*Lentinula edodes*) mushrooms around 1100 AD, with domestication efforts beginning centuries earlier. White button mushrooms (*Agaricus* spp.), most familiar to Americans and Europeans, were first domesticated in France in 1650. Commercial production began in the United States in the 1880s. *Agaricus* is the leading mushroom crop worldwide and accounted for 99 percent of the 1997 United States' mushroom production. Oyster mushrooms (*Pleurotus* spp.) were more recently domesticated, and now rank second in world production. Shiitake mushrooms, which are very popular in Asian cultures, rank third. Many other edible mushrooms, such as straw and wood ear mushrooms, are gaining in popularity.

Roughly 300 mushroom species are edible, but only 30 have been domesticated and 10 are grown commercially. Button, oyster, and shiitake mushrooms make up about 70 percent of the world's production (table 1). During the past 30 years, mushroom production worldwide increased

twenty-fold, with much of that increase occurring in the 1980s and 1990s. Increased demand for specialty mushrooms (everything besides *Agaricus*) has been particularly strong. Asian countries continue to dominate world production and consumption, however, consumption in the United States has increased sharply in recent years, providing potential opportunities for mushroom growers.

Mushroom production in the United States has traditionally centered in Pennsylvania, which produces nearly half the nation's button mushrooms. California and Florida are the second and third leading producers, with limited production in 27 other states. Large-scale growers with established, year-round markets dominate commercial mushroom production. In 1997, 7 percent of United States mushroom farms supplied 20 million pounds or more each, or 38 percent of total U.S. production. In contrast, 36 percent of mushroom farms produced less than one million pounds per year.

Even established growers are challenged with recent imports of canned *Agaricus* from China, Chile, India, and Indonesia. In the face of this competition, the prospects for new *Agaricus* growers are poor. The number of button mushroom growers in the United States has decreased steadily, from 357 in 1987 to 153 in 1997.

Table 1. World production of cultivated edible mushrooms in 1986 and 1994.

Species	Fresh weight and percentage of total production				Percent increase
	1986		1994		
	(X 1,000 tons)	(%)	(X 1,000 tons)	(%)	(%)
<i>Agaricus bisporus</i> (button)	1,215	55.8	1,846	37.6	51.9
<i>Lentinula edodes</i> (shiitake)	320	14.7	826	16.8	158.1
<i>Pleurotus species</i> (oyster)	169	7.8	797	16.3	371.6
<i>Auricularia species</i> (wood ear)	119	5.5	420	8.5	301.0
<i>Volvariella volvacea</i> (straw)	178	8.2	299	6.1	68.0
<i>Flammulina velutipes</i> (enokitake)	100	4.6	230	4.7	130.0
<i>Tremella fuciformis</i> (jelly fungus)	40	1.8	156	3.2	290.0
<i>Hypsizygus marmoreus</i> (bunashimeji)	---	---	55	1.1	---
<i>Pholiota nameko</i>	25	1.1	27	0.6	8.0
<i>Grifola frondosa</i> (maitaki)	---	---	14	0.3	---
Others	10	0.5	239	4.8	2,290.0

Table 1 adapted from S.T. Chang, 1996. Mushroom research and development - equality and mutual benefit. *Mush. Biol. Mush. Prod.* Vol. 2:1-10.

Specialty mushroom production is more evenly distributed throughout the United States than is button mushroom production. The number of commercial specialty mushroom growers in the United States decreased slightly (from 188 to 183) between 1995 and 1997. There are a few large-scale specialty mushroom farms. Most growers operate small farms and focus on local markets. For 1997, the average specialty mushroom farm in the United States produced approximately 52,000 pounds of mushrooms with gross

sales of about \$150,000. United States production of oyster and shiitake mushrooms appears in Figure 1.

Shiitake and oyster mushrooms are the best-known specialty mushrooms, and probably the easiest to market. *Auricularia* spp. (wood ear), *Volvariella volvacea* (straw mushroom), *Flammulina velutipes* (enokitake), *Grifola frondosa* (maitake), and *Tremella fuciformis* (white jelly or fungus ear) are also increasing in popularity. *Volvariella volvacea* (straw) mushrooms are

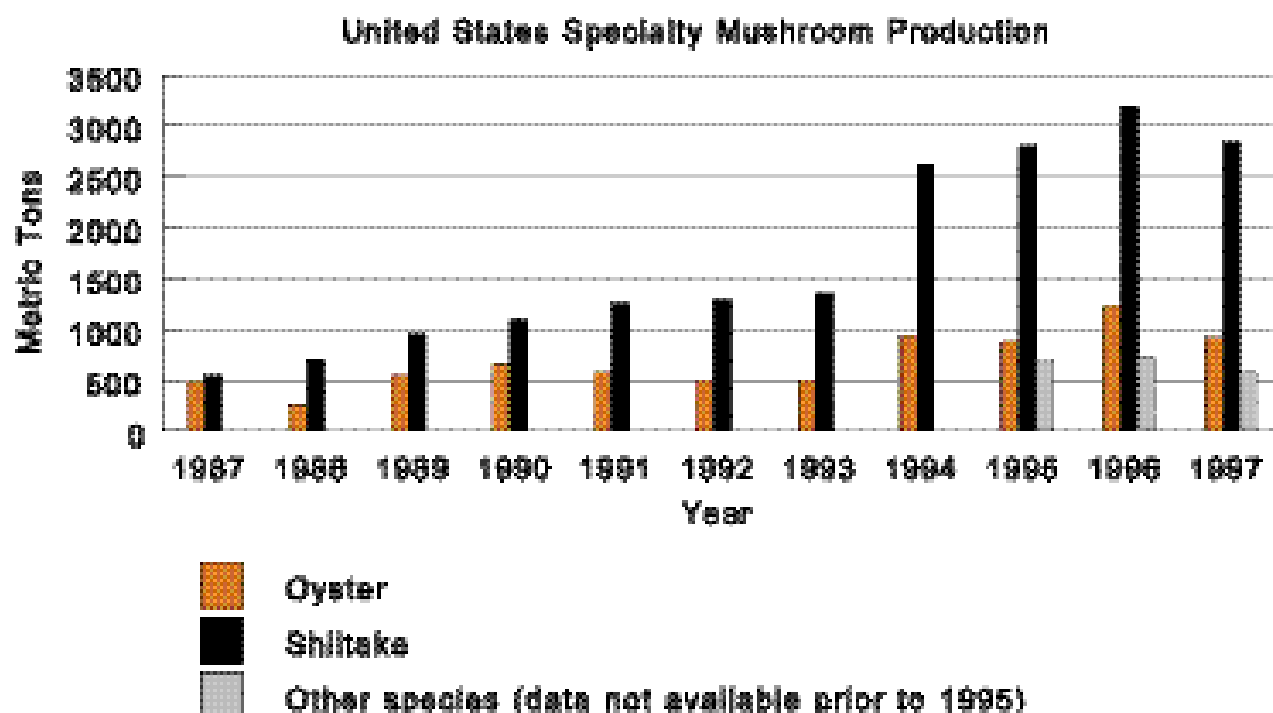


Figure 1. United States specialty mushroom production for 1987-1995. Data provided by the United States Department of Agriculture National Agricultural Statistics Service.

the easiest to grow, produce mushrooms in as little as 4 days, and are adapted to areas with high temperatures. They are not as popular with consumers as button, oyster, or shiitake mushrooms, but still account for 6 percent of the world's production. *Ganoderma lucidum* (reishi), *Hericium erinaceus*, and *Hypsizygus marmoreus* (bunashimeji) are medicinal mushrooms used primarily in Asia. Medicinal mushrooms require specialized marketing in the United States.

## Production facilities

Mushrooms lend themselves to many different growing systems from simple and inexpensive to highly sophisticated and expensive. This publication was written only to provide an overview of opportunities and risks for potential mushroom growers. Sources providing detailed, how-to cultural information are listed at the end of this bulletin. Much information on state-of-the art

mushroom production and marketing may also be found on the Internet. Be aware that some production techniques are patented and require payments to patent holders if they are used.

Shiitake has long been grown on sections of logs about 3ft in length. Oak is the preferred species, although beech, chestnut, and other hardwoods have been used in the United States. Gambel or scrub oak (*Quercus gambelii*) is found in parts of the Intermountain West and can be used for shiitake production. Other oak species suitable for growing shiitake are native to Oregon and California. For outdoor production, log sections are inoculated with spawn (a starter mix of fungal mycelium and sawdust or grain) and set aside to allow the fungi to develop. Shade cloth is often used to protect logs stored outdoors from excessive drying caused by direct sunlight. The development period is called the spawn run and can last 6 to 18 months, depending on the log

species, diameter, moisture, and temperature. At the end of the spawn run, the logs are transferred to a cool, moist raising yard where the mushrooms develop and are harvested. In outdoor systems, most shiitake production occurs in the spring and fall. Greenhouses and converted farm buildings are used to produce winter crops. A single log may bear five crops of mushrooms. Some other mushroom species can also be grown in basic, nonmechanical facilities.

Much of the increase in mushroom production is due to the development of high-yield systems that depend on precise environmental controls. In 1988, shiitake production in the United States was equally divided between natural logs and synthetic logs made from sawdust, straw, corncobs, and various amendments. Eight years later, synthetic log production doubled and now makes up more than 80 percent of the total. By using synthetic logs, growers can harvest shiitake mushrooms year-round and produce three to four times the yield in one tenth the time natural logs require.

High yields and rapid production cycles with most mushroom species require specialized facilities. Substrates (materials the mushrooms grow in) are blended and packaged into special plastic bags or jars. Typical substrates include sawdust, grain, straw, corn cobs, bagasse, chaff, and other agricultural byproducts. Containers and substrate are then either pasteurized or sterilized to remove contaminating microorganisms. Hot water baths can be used for pasteurization, but sterilization may require a commercial steam sterilizer. Some growers compost substrates outdoors and then sterilize them inside heated sheds.

After being pasteurized or sterilized, the substrate-filled containers are inoculated with the desired fungi and placed into spawn run rooms where temperature, humidity, light, and sometimes atmospheric gases are carefully controlled. When the spawn run is complete, the substrate may need additional treatments before mush-

rooms develop. Many mushroom species require changes in temperature, moisture, substrate, and/or light to begin fruiting. Large-scale, highly technical facilities are expensive to construct and operate. Whether you use a basic or sophisticated production system, growing mushrooms is labor intensive.

A third option for mushroom production is to harvest mushrooms from the wild. In the Pacific Northwest, large quantities of morel, chanterelle, matsutake, and bolete mushrooms are harvested each year. Offsetting the advantage of no production facilities are high labor costs, unpredictable crops, inclement weather, and increased transportation. Although researchers have made progress in domesticating morel mushrooms, most are still harvested from the wild. To learn more about wild mushroom harvests, refer to the *For more information* section later in this publication.



## Management

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Commercial mushroom production requires high levels of management input and skill. A common mistake new growers make is to believe that growing mushrooms is easy. Each species requires specialized treatment to produce consistent yields of high-quality, marketable mushrooms. Another common mistake is to start too large and diversify too soon. As mentioned earlier, mushroom growing is labor intensive. It is easy to quickly become overwhelmed with the physical requirements of mixing and sterilizing substrates, ordering and inoculating with spawn, maintaining environmental controls, harvesting and processing mushrooms, marketing, business management, and many other tasks that go with a commercial enterprise.

Trying to learn a single crop is difficult enough, and mastering several different mushroom crops at once may be impossible. Some spawn suppliers offer starter kits and instructions. Using small starter kits will allow you to gain some experience with different mushroom crops with minimum investments in time and money. Keep detailed production and financial records to evaluate which crops show commercial promise.

As with any other crop species, not all mushrooms are created equal. Different strains or lines of shiitake, for example, vary in color, size, shape, firmness, cultural requirements, and yields.

Only the largest mushroom growers produce their own spawn. Spawn culture is highly technical and requires specialized facilities and equipment. Most growers rely on companies that specialize in producing high-quality spawn for their culture material.

If you are not already experienced in mushroom production, start small and expand slowly. Take time to learn all you can about growing and selling

mushrooms while you gain some practical experience. Study the market and decide which types of mushroom crops and production systems would be enjoyable, feasible, and profitable for you. Join growers' organizations and subscribe to newsletters about mushrooms. Universities sponsor conferences and workshops on specialty farming in general and mushroom farming in particular.

## Marketing

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The greatest challenge all specialty farmers face is marketing. Deciding what to grow, where and how to grow it, who makes up the target market, and how to package and advertise are just a few of the things that go into marketing. A thorough study of mushroom production and marketing is imperative before buying equipment and starting even a small-scale operation.

The demand for specialty mushrooms is huge, particularly in Asian countries. Trying to market internationally, however, is beyond the resources of most small and medium-sized companies. China produces nearly 1.5 billion pounds and Japan more than 300 million pounds of shiitake each year. Likewise, national markets in the United States are dominated by large companies and produce brokers. Most small-scale mushroom farmers in the United States focus on local markets. Specialty mushrooms are best known and most widely used among certain Asian cultures, and local sales may be best in areas with large populations of Asian-Americans. Mushrooms are sold fresh, dried, or processed. According to the U.S. Department of Agriculture, most specialty mushrooms grown in the United States are sold fresh.

For wholesale, consider locally-owned or operated groceries, restaurants, and health food stores. You can make direct sales to customers through farmers markets, subscriptions, and on-farm sales. Forming a cooperative with other growers in your area can improve marketing by increasing quantities and variety. Particularly for dried or processed mushrooms, you might con-





sider selling direct to consumers through mail order or the Internet. Whatever your marketing strategy, remember that quality and grading are critical in producing and selling mushrooms. Before deciding on any market strategy, thoroughly explore local, state, and federal regulations that will affect your growing, processing, and shipping.

## Opportunities and risks

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Mushrooms offer small-scale growers several advantages. Growing facilities range from logs stacked outdoors under a shade cloth to sophisticated production chambers with precisely controlled temperatures, humidity, and light. Specialty mushrooms are high value crops, typically selling at wholesale prices of \$3 to \$6 per pound. Depending on the production system, you can grow large quantities in a small space.

Mushrooms can be delicious and are rich in proteins, vitamins, and minerals while containing little fat. Demand for exotic culinary mushrooms has greatly increased in recent years and shows no sign of slowing. Certain mushroom species reportedly provide health benefits, including anti-cancer and anti-viral properties and the potential to reduce cholesterol and the risk of heart disease. With alternative medicine becoming more widely accepted, opportunities for health foods and dietary supplements should continue to increase.

Researchers have developed methods of effectively and economically producing many species of edible mushrooms. These production

systems use agricultural waste products, including straw, chaff, sugar beets, corncobs, waste paper, sawdust, coffee grounds, livestock manure, slaughterhouse wastes, and other materials. Once the substrate has been broken down during mushroom production, it can be sold for organic fertilizers and compost.

With opportunities, however, come risks. If you grow mushrooms outdoors, weather is an important consideration. Mushrooms are strongly affected by temperature, humidity, and light. A cold snap, heat wave, or drought can reduce yields or favor the development of undesirable “weed molds.” Outdoor production also generally provides lower yields and longer production times than are available with indoor facilities. Outdoor-grown mushrooms also fruit seasonally, producing crops when supplies are greatest and prices are lowest. People are not the only ones who enjoy fresh mushrooms. Insects and animal pests can become serious pests for mushroom farmers, especially with outdoor operations.

Indoor growers also face challenges. Precision-controlled indoor facilities are expensive to build, operate, and maintain. Operating and maintaining environmental controls require a certain degree of technical expertise. Cleanliness is critical in controlled environment production systems to ensure high-quality products free of potentially toxic contaminants. Pest control is also critical because some insect pests, such as fungus gnats, flourish under the same conditions that favor mushrooms. With high yields and short production cycles, harvest windows are short.

Whether you grow mushrooms indoors or out, labor should be a serious concern. Mushroom production is labor intensive. Before expanding beyond a small operation that you can maintain yourself, ensure that you have a consistent supply of laborers willing to work for you at competitive wages. Be prepared to provide training for your workers. Know and comply with worker protection regulations.

While demand for specialty mushrooms has increased greatly in recent years, so has production. Between 1986 and 1994, worldwide production of shiitake mushrooms increased 158 percent and oyster mushrooms by 371 percent. At the same time, the prices growers received dropped. For United States' shiitake growers, prices decreased from \$5.42 per pound in 1986 to \$3.09 per pound in 1997. From 1995 through 1997, wholesale prices for oyster mushrooms decreased from \$2.49 to \$1.90 per pound. Only increased yields and shortened production cycles have kept growers profitable. Oyster and shiitake mushroom production in the United States peaked in 1996 and decreased in 1997 (figure 1).

The development of improved production methods and increased demand has motivated large companies around the world to start growing mushrooms. Increased competition means that growers must carefully consider and manage marketing. Be prepared for market slumps caused by overproduction. Good practices include having backup plans in place for selling to alternative markets or preserving and storing your mushrooms for later sales.

Another challenge growers face is liability. Oyster mushrooms, for example, produce spores that cause allergic reactions in some people. Provide the appropriate safety equipment for your workers, including masks or respirators to protect them from fungal spores. Know what to do if an employee experiences an allergic reaction. Perhaps a greater concern is the risk of being sued by a consumer who becomes ill and accuses you of selling contaminated produce. Agricultural waste products used for substrates sometimes contain

pesticides, medicinal residues, and other chemicals that can be concentrated during recycling. They may also contain toxic microorganisms, such as aflatoxin. You can reduce liability risks by ensuring your substrates are free of pesticides and other toxins; using only high-quality, commercially-grown spawn; and maintaining hygienic conditions and excellent production records. Liability insurance would also be advised.

Be cautious about claims of medicinal and health-related properties. While mushrooms have long been used as medicines and health foods, supporting scientific evidence for their use is often sketchy, at best. In selecting mushroom crops, stay with those proven safe for human consumption. Don't experiment! Remember that some fungi produce deadly toxins. Safe and effective research on the effects mushrooms have on humans requires highly specialized training and facilities, and is closely regulated by health agencies. Avoid unsupported health claims in your marketing. Ensure that you meet or exceed local, state, and federal laws regarding production and marketing of food products. Products marketed as medicinal must meet United States Food and Drug Administration regulations.

## In conclusion

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Specialty mushrooms offer small-scale growers opportunities, however, there are risks. Do your homework before investing in land or production facilities. Read several books by different authors to get a balanced view of mushroom farming. Treat claims of quick and easy profits with great skepticism. Visit several mushroom growers outside your area to gain a grower's-eye-view of what it is like to produce and market mushrooms. Join mushroom growers' organizations and attend conferences and workshops. Calculate your costs for starting and operating a mushroom farm, including labor costs. Determine break-even points and the time you will need to recapture your investment. Be conservative in estimating yields, sales, and profits. Plan on supporting your mushroom operation with savings or off-farm

work until you pass the break-even point. In short, give yourself every chance for success.

## For more information

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### Extension publications

The University of Idaho has many pamphlets, video tapes, and software packages on establishing and operating agricultural enterprises. To order publications or a catalog, contact Agricultural Publications, University of Idaho, Moscow, ID 83844-2240. The Internet address is <http://info.ag.uidaho.edu>. Publications of particular interest include:

Forming a cooperative. CIS 840.

Business and the family. CIS 940.

Licenses and legal requirements. CIS 941.

Conduct your own garden research. CIS 1041.

Marketing your produce directly to consumers. EXT 742.

Specialty farming in Idaho: Is it for me? EXT 743.

Specialty farming in Idaho: Selecting a site. EXT 744.

Special Forest Products. CIS 952.

Cultivation of Shiitake on Natural and Synthetic Logs. 1997. D. Royse. Order by contacting the Publications Distribution Center, Pennsylvania State University, 112 Agricultural Administration Building, University Park, PA 16802. Phone: 814-865-6713.

### Government publications

The USDA Forest Service has many publications on harvesting special forest products, including mushrooms. Many of these publications can be downloaded from the Internet or ordered from on-line catalogs. An excellent starting point is: USDA Forest Service Pacific Northwest Research Station, P.O. Box 3890, Portland, Oregon 97208-

3440, phone: (503) 808-2592. [Http://www.fs.fed.us/pnw/](http://www.fs.fed.us/pnw/).

Two publications of particular interest from the PNW Research Station are:

Molina, R., et al. 1993. *Biology, Ecology, and Social Aspects of Wild Edible Mushrooms in the Forests of the Pacific Northwest: A Preface to Managing Commercial Harvest*. PNW-GTR-309.  
Hosford, D. et al. 1997. *Biology and Management of the Commercially Harvested American Matsutake Mushroom*. PNW-GTR-412.

### Books

Many books are available on growing and using mushrooms. For a detailed list consult *Books in Print* at your library or bookstore. Some examples include:

*Przybylowicz, P. and Donoghue, J. 1989. Shiitake Growers Handbook. Kendall/Hunt Pub. Co., Dubuque, IA.*

*Stamets, P. 1993. Growing Gourmet and Medicinal Mushrooms. Ten Speed Press, Berkeley, CA.*

*Weber, N. 1995. A Morel Hunter's Companion. Thunder Bay Press, Lansing, MI.*

### Journal articles

*Royse, D. 1997. Specialty Mushrooms and Their Cultivation. Horticultural Reviews, Volume 19, pp 59-97. ISBN 0-471-16529-8.*

### Internet

The Internet provides access to hundreds of sources of information on mushroom cultivation and use.

## About the author

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## Growing Shiitake Mushrooms in an Agroforestry Practice

by **Johann Bruhn, Ph.D.**, Research Associate Professor, Division of Plant Sciences, University of Missouri-Columbia, & **Michelle Hall**, Senior Information Specialist, Center for Agroforestry, University of Missouri-Columbia

### Cultivating Shiitake Mushrooms through Forest Farming

Cultivating shiitake mushrooms represents an opportunity to utilize healthy low-grade and small-diameter trees thinned from woodlots as well as healthy branch-wood cut from the tops of harvested saw-timber trees. When the mushrooms are collected and marketed, the result is a relatively short-term payback for long-term management of wooded areas.



The cultivation of shiitake mushrooms on solid wood requires a significant amount of shade and wind protection, but not a significant amount of acreage. Therefore it is an excellent opportunity for landowners with smaller acreages to utilize forested or shaded areas. Shiitake producers can often obtain wood for cultivation from land

“When I walk into a restaurant and see my mushrooms on the menu, it gives me huge pleasure and makes all the work worthwhile.”

– Nicola McPherson, Ozark Forest Mushrooms



management agencies or private landowners. In addition to making productive use of woodlots and forested acres, logs that have been used for shiitake production, called “spent” logs, can be ground and recycled as compost (see page 12 for *Kimmons and others, 2003*) or used as a fuel and heat source for winter mushroom production (see box page 6).

Shiitake mushrooms can be grown indoors or outdoors on almost any deciduous wood that retains its bark for a number of years. When shiitake are cultivated outdoors on logs in a managed shade environment, a forest farming practice is initiated.

The practice of intentionally managing shade levels in a forest to favor the production of certain crops represents the agroforestry practice called forest farming. Properly applied, forest farming can enhance and diversify income opportunities, while at the same time improving the composition and structure of the forest for long-term stand health, quality and economic value. By developing an understanding of the interactions between the overstory trees and the understory environment, forest management activities can be used to create understory sites ideal for growing profitable shade-loving crops like shiitake mushrooms. The shade-loving plants that may be grown in the





*In this forest farming practice, shiitake and other forest farming products, such as ferns and ginseng, are grown under the shade of trees.*

understory of a forest are often termed non-timber forest products. However, to accomplish this, forest canopy densities must be controlled.

### **Getting Started: Basic Steps for Shiitake Production**

- 1) Understanding the Shiitake Life Cycle
- 2) Selecting and Preparing a Shiitake Cultivation Site
- 3) Obtaining Substrate Logs
- 4) Thinning as a Tool for Shiitake Cultivation
- 5) Shiitake Strain Selection
- 6) The Inoculation Process
- 7) Spawn Run
- 8) Fruiting the Crop
- 9) Harvesting
- 9) Pest Management
- 10) Shiitake: An Emerging Market

### **Understanding the Shiitake Life Cycle**

Although specialty mushroom production in a forest farming practice is intriguing, it should not be considered “quick and easy.” To establish a successful production system, a great deal of knowledge and planning is necessary. Before beginning to cultivate shiitake mushrooms, it is important to understand the shiitake life cycle and how the forest farming relationship interacts with this cycle.

Fungi do not use photosynthesis to produce their own food. Many mushroom fungi (including shiitake) obtain energy and nutrients by decomposing dead plant material. Shiitake decay the cellulose and lignin of wood. The visible part of the shiitake fungus that is harvested and consumed is the fruiting body (mushroom), connected to an unseen mycelium consisting of tiny threads growing in the log substrate. The mycelium derives nutrients by decaying inoculated logs, and a portion of these nutrients is eventually used to produce mushrooms.

Mushrooms are often called fruiting bodies because they are the site of spore production by the fungus. The mushroom stem serves to elevate the mushroom cap into the air; the cap serves to protect the developing gills; and the gills provide an extensive surface on which myriad spores are produced. Mushroom spores are sexual propagules of the fungus species, and therefore are highly variable. This is why we do not use spores as inoculum to cultivate shiitake. The mycelium and mushrooms produced from spores would likely differ from the parent strain in various important characteristics.



*Above: The mycelium is often visible at the ends of logs after spawn run. The rows of inoculation holes were spaced too far apart in the log above to effect complete colonization. As a result, undesirable colonization by competing decay fungi may result. (See box page 5.) Inset: Inoculated and fully colonized logs at the fruiting stage.*



### **Selecting and Preparing a Shiitake Cultivation Site**

One of the keys to successfully growing shiitake mushrooms in the forest is to select or produce a cultivation site with an overstory canopy that provides the appropriate amount of shade.

In the initial process of selecting a shiitake cultivation site, realize that north- to east-facing slopes will help protect against sun and heat. Ravines and valleys often provide access to water as well as superior shade.

Shade levels can be adjusted by manipulating the structure and/or species composition of the forest. If there is not enough shade for the understory crop, more trees can be planted or retained to produce more shade. Wind protection and shade can also be enhanced by hanging a curtain of mesh shade fabric

### **Materials Checklist:** **Outdoor Log Cultivation of Shiitake**

- Access to water for forced fruiting. (Cooler water is better.)
- A cultivation area with shade and protection from wind.
- Hardwood logs cut from healthy pole-sized trees, or from healthy branches of larger trees.
- Extremely high-speed drill (available from professional suppliers). A 10,000 RPM works very well for this purpose. If you purchase only one piece of equipment, it should be an extremely high-speed drill.
- Screw-tip drill bits with adjustable collar stops.
- Spawn and spawn-plunging tool.
- Cheese wax: For sealing sawdust or dowel spawn.
- Daubers: For applying cheese wax.
- Spawn and supplies can be purchased from professional suppliers, such as Field and Forest Products, Inc. – see page 11.

around the edges of the cultivation site. If there is too much shade, the stand can be thinned or individual trees can be pruned. Over time, the changes that occur in a mature or developing stand may require that both thinnings and new tree establishment be applied to maintain the required level of shade and wind protection. Evergreen species provide the most useful spring and autumn shade, but an overstory of sugar maple or oak will provide earlier and later season shade than cherry, walnut or honey locust. A good way to judge the adequacy of shade and wind protection in the cultivation area is based on mushroom condition. Under excessive shade, mushrooms produce longer stems and smaller caps. A 1- to 2-inch stem is ideal. If protection is inadequate, developing mushrooms may suffer from exposure and dehydration.

### **Obtaining Substrate Logs**

Log-grown shiitake are better quality and can have a longer shelf life than shiitake grown on supplemented sawdust substrates (a common large-scale indoor method). Log-grown shiitake also achieve higher prices in some segments of the wholesale and retail markets, especially if they can be certified local or organic.

Shiitake logs can be obtained both from the stems of healthy young trees selected for thinning and from healthy branch-wood taken from the tops of trees felled for saw-timber. In either case, only logs with intact bark, free of heartrot, and with as much sapwood as possible, should be selected. Logs already dead or with heartrot will be infected with other decay fungi and must be avoided. If you do not have access to forested areas, purchase logs from a public land management agency or a contract logger. If you contract for logs, be sure to specify undamaged bark and appropriate diameter.

The ideal time to fell trees is mid- to late-winter, for early spring inoculation. This is especially true for sugar maple, which begins sap flow earlier than oaks. For spring inoculation, it is best to harvest trees in February for inoculation in April or early May. Felled logs should be protected from desiccation (wind and sun) to maintain an internal moisture content above 35 percent.

While it is desirable to inoculate logs for shiitake production in the very early spring, some large-scale growers need to inoculate a portion of their crop of logs during the early winter. If this is necessary, it is important not to harvest trees for substrate logs until they have achieved complete dormancy. Trees harvested before they are completely dormant will not have finished storing carbohydrate in the sapwood, and therefore will contain less energy for mycelial growth and mushroom production.

At the University of Missouri's Horticulture and Agroforestry Research Center, sugar maple and white oak have proven to be superior substrate species. Other dense hardwoods with good bark retention can also be used to produce shiitake. Pines and other conifers are not effective hosts for shiitake production.

Properly managed, smaller logs (3" to 5" diameter at the smaller end and 36" long) produce more mushrooms per unit of log weight and are consumed more quickly than larger diameter logs. This is partly because larger logs (especially oaks) tend to contain more decay-resistant heartwood. Also, the bark on larger logs begins to deteriorate before the entire wood volume can be exploited by the shiitake. Also keep in mind that larger logs are heavier, and logs need to be moved at least several times in preparation for their service as shiitake substrate.

## Thinning as a Tool for Shiitake Cultivation

Keep in mind that the area to be managed as the actual mushroom production site is relatively small compared to the forest area required to produce a sustainable supply of substrate logs.

Before thinning a forest area, careful thought and planning is required. To maximize forest health, timber, wildlife and/or aesthetic values, talk to resource professionals at the Missouri Department of Conservation (<http://mdc.mo.gov/>), Natural Resources Conservation Service ([www.nrcs.usda.gov/](http://www.nrcs.usda.gov/)) or the Missouri Consulting Foresters Association ([www.missouriforesters.com](http://www.missouriforesters.com)). Also, visit the Missouri Timber Price Trends Report online at [www.mdc.mo.gov/forest/products/prices/](http://www.mdc.mo.gov/forest/products/prices/) for tree values, to avoid unnecessarily removing a potentially high-value species. Traditionally, black walnut, white oak and red oak species have maintained some of the best timber values. Trees that are straight and that branch high in their canopy represent the highest value within a given species. Trees with forks, several knots or visible wounds will have a lower timber value. The crowns of healthy trees will have large, vigorous leaves (not stunted, pale or wilted) and few dead branches. A tree with more than 15 percent dead branches in its crown indicates the tree is likely suffering from decline.

For a detailed explanation of related forestry practices, see “Internet Resources,” page 11.

## Shiitake Strain Selection

Shiitake strains have been bred and selected for many characteristics and purposes. For example, shiitake strains differ in the size, texture and ornamentation of mushroom caps. Strains differ in the length of their spawn-run period (see “Spawn Run,” page 5), in their response to cold-water forcing (see “Fruiting the Crop,” page 6) and in their tendency to fruit at different temperatures. Certain strains are preferred for indoor vs. outdoor cultivation. One may grow several strains to extend the fruiting season or to cover the range of growing season temperatures.

Strain integrity is maintained by storing mycelium in an inactive state at ultra-low temperatures to prevent genetic change. Samples of mycelium are brought out of frozen storage to produce vegetative spawn in pure culture as needed. High-quality spawn of known strains is well worth the price.

Ask your reputable spawn provider (consider *Field and Forest Products, Inc.*; see “Internet Resources,” page 11) for guidance in selecting strains appropriate to your climate and production needs. University of Missouri Center for Agroforestry (UMCA) research has shown WR46 (a wide-temperature strain) produces best under Missouri conditions. Night Velvet (a warm-weather strain) produces especially beautiful mushrooms.

Spawn is sold in plastic bags that contain 5 to 10 pounds of colonized amended sawdust. Bags have a breathing patch of mesh fabric that permits gas exchange and prevents fungus suffocation without permitting contamination. Each block of spawn consists of brownish sawdust bound together by white mycelium, all covered with a white mycelial felt with brown patches. Mushrooms may even form inside the bag and should be discarded or eaten. Spawn should be ordered several months in advance of need, to allow for production time. The supplier should try to ship the spawn to arrive just prior to planned inoculation.



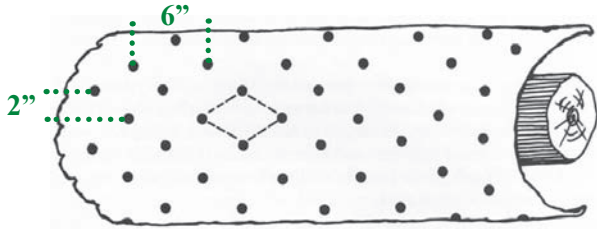
Holes are drilled in cut logs using an extremely high-speed drill.

## The Inoculation Process

Logs cut from healthy trees are inoculated with shiitake spawn inserted into holes made in the substrate logs using an extremely high-speed drill. Holes should be approximately 1" deep, separated by 6" along rows 2" apart and staggered to produce a diamond pattern (see *diagram page 5*). The inoculation process should be conducted in the shade to conserve moisture.

Spawn can be purchased in several forms: “traditional” loose sawdust spawn; styrofoam-capped “thimble” spawn; or wooden dowel spawn. Wooden dowel spawn has been recommended for late autumn

## Inoculating and Sealing



Drill holes 1" deep in a diamond pattern, separated by 6" along rows 2" apart. If inoculation holes are spaced too far apart, spawn run will be incomplete and contaminating fungi will gain a foothold. (Image courtesy Mary Ellen Kozak and Joe Krawczyk, "Growing Shiitake Mushrooms in a Continental Climate.")



Spawn should be injected immediately into pre-drilled holes in the log using a spring-loaded thumb injector. Any delay between drilling and inoculation will promote desiccation and contamination of the logs. These supplies are available from commercial mushroom suppliers, such as Field and Forest Products, Inc. (see page 11).



Hot cheese wax is applied immediately to seal inoculum into the log to prevent spawn desiccation. Note the sizzling of the wax when applied to the inoculum.

inoculation because it may be less likely to frost heave from the log during cold winter weather. Research has shown at HARC that logs inoculated with loose sawdust spawn produce best regardless of season of inoculation. Although thimble spawn produces quite well, it more expensive and is

produced in non-recyclable plastic sheets. The dimensions of dowel, loose sawdust and thimble spawn differ slightly, so attention must be paid to the depth and diameter of holes drilled. Screw-tipped auger bits with adjustable collar stops work best.

Holes should be filled with spawn immediately after drilling to prevent desiccation and contamination. Dowel spawn is inserted with a hammer; loose sawdust spawn is inserted with a spring-loaded thumb pressure spawn-plunging tool; and thimble spawn is inserted with thumb pressure. When using dowel or loose sawdust spawn, be careful not to leave the dowel protruding or overfill the holes.

Dowel and loose sawdust spawn need to be covered immediately with sizzling-hot wax (cheese wax is generally preferred), using a simple daubing device. The hotter the wax, the better the seal. If the dowel is left protruding or the sawdust spawn is mounded, the wax seal will be vulnerable to damage. The styrofoam cap on the thimble spawn provides sufficient protection from desiccation and contamination.

## Spawn Run

A thread-like network of mycelium grows from the spawn into the inoculated log. The period of time during which the mycelium initially colonizes the log (the "spawn run") requires about a year.

Logs should be stacked loosely after inoculation for the spawn run (pre-production) period to allow for initial log colonization. Appropriate log orientation depends on your ability to protect the logs from wind and sun. If your region has high humidity or you are able to sprinkle your logs with water during dry weather, you can stand the logs up or crib stack them loosely. Otherwise, logs can be lain horizontal on rails elevated 4" to 6" off of the ground. Logs should never be in contact with soil, to avoid contamination.

Optimal log moisture content for shiitake spawn run is 35 to 45 percent. Moisture conservation is best achieved by protecting logs from wind and sun while maintaining enough ventilation to allow bark to dry after periodic sprinkling to simulate a soaking rain. Constantly moist bark can foster the development of molds and other competing decay fungi, resulting in premature bark loss.

Although logs inoculated between December and May will produce a few mushrooms by the following

autumn, they should not be “forced” to fruit (see “Fruiting the Crop, next section) until the following

spring to assure good spawn run. Energy devoted to fruiting slows the spawn run process and can give competing fungi an advantage.

## Fruiting the Crop

The timing of mushroom production in nature depends on both temperature and the timing of precipitation. Once a log has “flushed” (produced a crop of mushrooms), it should be allowed to “rest” for 10 to 12 weeks to provide the mycelium time to replenish the energy required for fruiting. Thus, forcing 8 to 10 percent of one’s logs to fruit every week permits constant fresh production to meet market demand. When logs are forced to fruit too frequently, fewer and smaller mushrooms are produced.

Forced fruiting involves submersion of logs in cool water for approximately 20 hours. UMCA research has demonstrated that use of 52-degree F water stimulates more fruiting than warmer water.

This practice will also result in earliest recovery of log value by stimulating both wood decay and fruiting. As a result, logs will return their optimum value more quickly than with only natural rainfall.

Wide temperature range and warm weather strains of shiitake spawn respond well to this method of forcing. Cool weather strains respond to air



*Inoculated oak logs have been carefully cut to size for proper stacking in a simulated forest shade environment at the Ozark Forest Mushrooms commercial shiitake operation. Selected saw-timber trees grown on the premises are cut and sold to sawmills; residual branch-wood is the main source for shiitake logs. Spent logs should be removed from the production area to avoid contamination by competing molds and decay fungi, and can be burned for heat in a year-round greenhouse. Top image: Crib stacks for holding logs during “spawn run.” Logs should be well-spaced in crib stacks to prevent mold development. These logs will be relocated under a forest canopy to begin “fruiting” (inset). Then, during fruiting, these logs will be placed upright on end for more efficient mushroom picking.*

## Winter Production: Creative Recycling of Spent Logs

*In the right setting, shiitake can be produced indoors during the winter. Shade and light levels, ventilation and temperature must be controlled to recreate the outdoor fruiting season environment. In the late autumn, logs that have just completed their first fruiting season (logs in prime condition) are moved into the greenhouse for this purpose.*

*Dan Hellmuth and Nicola McPherson, proprietors of Ozark Forest Mushrooms, have built a greenhouse with a radiant heated concrete floor and are using spent shiitake logs to provide much of the fuel for heating this indoor winter cultivation facility.*

*“We’re not actually depleting our forest resources over time,” Hellmuth said. “Basically we’re turning waste wood into high-value mushrooms and then using the spent logs for fuel to heat our greenhouse to continue production throughout the winter.”*

*(At right: Ozark Forest Mushrooms’ greenhouse facility. Inset: The wood-burning boiler provides hot water for the radiant slab greenhouse floor.)*





Top: Shiitake logs soak overnight in a stock-watering tank equipped with a drain. Inset: At this point, developing mushrooms may be protected from both desiccation and heavy rain by covering logs during fruiting with horticultural fabric (see below).

temperature fluctuations in spring and autumn, but are unresponsive to soaking. For this reason, growers often prefer to inoculate their largest logs with cool weather strains because they do not need to be moved to a tank for soaking and can be left to fruit naturally in response to changing temperature.

When logs inoculated with wide-range or warm temperature strains begin to fruit spontaneously in the early spring, it is time to initiate a forcing routine.

Logs should begin to “pin” (initiate mushrooms), often at inoculation sites, within a few days after soaking. Once the bark surface dries after removal from soaking, the logs may be covered with a horticultural fabric to prevent both desiccation during dry weather and watersoaking during heavy rains. However, if the fabric blocks too much light, the mushrooms will develop longer stems and smaller caps. Fruiting should be complete in approximately one week.

Water is also needed for occasional thorough sprinkling during summer droughts. Logs should not be continuously watered, and the bark surface should dry out between waterings to minimize development of destructive surface molds and competing decay fungi. Log ends should be kept off the ground (or on weed barrier fabric) to prevent colonization by soil-borne decay fungi, such as *Armillaria* (the honey mushroom).

Indoor commercial shiitake production presents its own special challenges, requiring environments

similar to outdoor conditions, with variable temperature, lighting, humidity and ventilation. Indoor production facilities are vulnerable to build-up of pests and mold populations if the environment is not properly maintained.

## Harvesting

Mushrooms develop over a several day period, depending on temperature and moisture. Mushrooms should be harvested when their caps are 70 to 90 percent open (expanded), while the cap margin is still slightly inrolled. Agricultural shade fabric can be used during fruiting to both minimize mushroom desiccation and to protect mushrooms from absorbing too much water during rainfall. Mushroom development is much faster during warm weather than cool weather. As a result, nearly mature mushroom caps can expand beyond prime marketable condition overnight during very warm weather.

Harvest mushrooms by twisting and pulling the stem off of the log. Cutting the mushroom stem will shorten the shelf-life by causing the mushroom to dry out through the cut stem. Leaving the mushroom stem in the woods can increase insect pest problems.



Harvested mushrooms should be taken to market as quickly as possible following harvest. While shiitake have a good shelf life compared to other mushrooms, their quality begins to deteriorate slowly after harvest. Clearly, a better price will be obtained for the freshest mushrooms. The best price is obtained through retail sales to restaurants or at farmers’ markets. Fresh mushrooms should be stored in well-ventilated, humid containers like paper bags or cardboard cartons.

## Pest Management

Properly inoculated, shiitake are relatively pest resistant. The main considerations in pest management are to maintain proper inoculation density, prevent log desiccation and avoid log contact with the soil. Proper spacing of inoculation points, and prompt filling and sealing is essential for efficient spawn run. If inoculation sites are spaced too far apart, or if inoculation is delayed, other decay fungi will become established in the log and reduce shiitake production accordingly.

Correspondingly, as shiitake mushroom production begins to decline after several years, logs become a liability due to the build-up of contaminating fungi. Smaller logs are generally consumed more rapidly than larger. Logs that produce abundant fruiting bodies of competing fungi should be removed from the commercial production area, because fruit bodies of contaminant fungi are producing spores that increase their presence in the production area.



Above: *Stereum* (a contaminating wood decay fungus) fruiting on log end between rows of inoculation sites. Inset: Snail feeding on shiitake cap.



People aren't the only animals that enjoy shiitake. The key to minimizing stress in this regard is to grow enough shiitake to supply the neighborhood! Mice will leave occasional incisor marks on mushrooms they have tested for quality, but they cause little damage. Mushrooms forming close to the ground may harbor irritating numbers of fungus gnats between the gills, and slugs and snails can damage shiitake caps during prolonged humid weather. Finally, shiitake cultivation involves substantial activity in the production area, which can result in disturbance and compaction of the forest floor. Unmanaged, this disturbance can stress the trees producing the shade required for mushroom

production. Thus, it is very important to establish a "traffic pattern" in the production area that minimizes compaction.

## Shiitake: An Emerging Market

Markets for shiitake and other specialty gourmet mushrooms continue to show promising profit potential for Missouri forest land owners. Interest in fresh locally grown shiitake mushrooms is increasing with gourmet chefs, farmers' markets and household consumers, as information spreads about their nutritional benefits and rich, versatile taste.



Fresh shiitake mushrooms harvested from Ozark Forest Mushrooms are packed in cardboard containers for delivery to chefs and restaurants, left inset. Top and right inset: Value-added dried mushroom mixes are paired with locally grown rice for an attractive and consumer-friendly retail product.

## Ozark Forest Mushrooms carves market niche

One of the Midwest's most significant demonstrations of a successful forest farming practice is Ozark Forest Mushrooms near Eminence, Mo. Dan Hellmuth and Nicola McPherson established the mushroom operation in 1990 in the midst of what was then a timber operation. Together with a small staff, they coordinate every step of the value-added process, from procuring the logs to packaging consumer-friendly, locally produced mushroom products.

A key to their success is developing an agroforestry practice compatible with their land base. Under the guidelines of the Stewardship Incentive Program, administered by the Missouri Department of Conservation, Dan and Nicola recover a renewable supply of mushroom logs from the tops of harvested saw-timber trees, while simultaneously maintaining a healthy forest. Consequently, what began 18 years ago with only 100 oak logs in production



has grown to 16,000. Only five acres of the couple's 2,500 forested acres are used for actual mushroom production. Their outdoor production site is situated under a short-leaf pine canopy, which provides year-round shade.

Ozark Forest Mushrooms gives particular emphasis to targeted marketing of their value-added boxed mixes and products. "The biggest marketing challenge for a rural area is that most of the mushrooms are a fairly high-value specialty food, and the largest market is in some of the state's bigger cities," said Hellmuth. "We are marketing products in St. Louis and need to deliver them to the city on a weekly basis."

### *Prices and marketing strategies*

Many landowners fail at non-timber forest production by overlooking the importance of marketing research. Prior to beginning a specialty mushroom operation, investigate the possible markets in your area and know the price range you may encounter. Does the retail price compensate for the materials that will be needed? You should take the time to learn who your potential buyers are and what prices they are willing to pay. It is also helpful to learn how your local grocers place and price specialty mushrooms in the store, interview other growers and observe consumers purchasing mushrooms. Visit farmers' markets to see if they are being sold there, to whom and at what price. Contact restaurants to determine if they are interested in offering dishes prepared with fresh mushrooms. Don't forget about the market opportunities for mail order or Internet sales. Value-added products, like boxed mixes, sauces and dried mushrooms are another option.

In all markets, the relationship you establish with your buyer is critical. Be certain you have the production capacity before arranging an order. Remain in close contact with the buyer to ensure they have received the quality they were seeking.

Consumer education is also critical. Prepare a pamphlet for your buyer, telling them about the careful steps you take in production and ways to keep the mushrooms fresh in storage. McPherson gives customers a flyer telling the story of their operation, their local employees and the growing process. In an effort to reinforce the connection between customers and locally-grown foods, Ozark Forest Mushrooms has become part of a chef's

collaborative to promote local farms and foods to area restaurants.

"Cross-marketing with other locally grown foods helps build name recognition and an attractive connection to the local community," McPherson said. Keep in mind that the better the quality of mushroom you produce, the higher the price you can achieve. The best prices are obtained through restaurateurs. It is not uncommon to achieve a price of \$10 to \$15 per pound for fresh, high-quality shiitake sold to a restaurant. The lower prices you observe at supermarkets reflect the lower-quality mushrooms that growers are unable to sell to restaurants or at farmers' markets.

Additional markets include catering companies and organic food stores. Ozark Forest Mushrooms refrigerates its mushrooms within one hour of picking to retain optimum freshness and quality, and then ships directly or delivers to customers.

"As you try to manage your market, you should work toward producing a steady supply of mushrooms. Your customers will expect that," McPherson said.

### **Why Shiitake?**

The rich "umami" flavor and meaty texture of shiitake mushrooms is outstanding when sautéed, broiled, baked or grilled. A staple in the Asian diet for centuries, the shiitake mushroom has become the second-most consumed mushroom in the world. It is the third-most commonly consumed mushroom in the U.S., after white button and portobello mushrooms. In addition to great taste and versatility, shiitake are gaining worldwide recognition for health benefits.

Exotic mushrooms – including shiitake – have long been used for medicinal purposes in Asia. Lentinan, a natural complex carbohydrate found in shiitake, is used as a cancer treatment in Japan. In addition, the mineral selenium – shiitake are a good source – is being studied in the prevention and treatment of some types of cancer (selenium is a type of antioxidant), according to the National Cancer Institute's Web site, [www.cancer.gov](http://www.cancer.gov)

## Shiitake are nutritious

- Low in calories
- Low in glucose (beneficial for diabetics)
- Low sodium content
- High content of potassium and phosphorous
- High content of trace elements, including copper and zinc
- Good source of fiber and high-quality protein

**Umami** (oo-MA-mee): A meaty, savory, satisfying taste. Often described as the “fifth taste,” after sweet, salty, sour and bitter. Discovered in Japan in the early 20th century. Foods with the umami taste have high levels of glutamate, a building block of protein. MSG (monosodium glutamate) is a processed additive that can add umami taste to food. Umami is found in wine, parmesan cheese, anchovies and soy sauce, for example, in addition to shiitake.

## Recipes

### **Crisp Cucumber Shiitake Salad** *David Owens, modified by J. Mihail*

- 1/2 lb. cucumbers (pref. seedless; peel only if waxed)
- 1/2 T. salt
- 1/2 large red onion
- 2 C. finely sliced shiitake
- 2 t. salad oil
- 1/4 C. rice wine vinegar
- 2 T. honey
- 2 t. sesame oil
- black pepper to taste

Wash cucumbers and slice thin. Toss with salt and allow to drain in colander for 2 hours. Slice onion as thin as possible and set aside in large mixing bowl. While cucumbers drain, heat salad oil in heavy skillet just until smoking. Brown mushrooms in hot oil, cooking just until tender and seared. Remove from pan to cool. Combine remaining ingredients with onion and mix thoroughly. Add salted cucumbers and shiitake, toss to coat with the dressing mixture. Serve (makes 4 portions). Recipe scales up well!

### **Shiitake Soup** *Mary Ellen Kozak’s Mom*

- 1/4 lb. mushrooms, coarsely chopped
- 2 C. water
- 3 T. butter
- 3 T. flour
- 2 C. skim milk w/ shredded lion’s mane mushroom
- 1/4 C. onion, chopped

Pour water over 2/3 of the mushrooms and simmer 20 minutes. Melt butter, and saute the remaining mushrooms and all the onion until lightly browned. Add flour to butter/mushroom/onion mixture, and cook 5 minutes. Add milk mixture and broth/mushroom mixture, and simmer 5 minutes. Season with salt and pepper and serve.

### **Mushroom, Barley and Parsley Chowder** *J. Mihail*

- 1 1/2 lb. mushrooms
- 1/4 C. olive oil
- 2 large onions, chopped (or 3 leeks)
- 1/4 C. sweet Hungarian (or regular) paprika
- 1 can (14.5 oz.) Roma tomatoes
- 2 qts. regular-strength chicken or beef broth
- 2 C. water
- 1 C. pearl barley, rinsed
- 2 T. red wine vinegar
- 1 C. minced parsley
- salt and pepper

Slice mushrooms thinly. In a 6- to 8-qt. pan over high heat, combine mushrooms and olive oil. Stir often for about 15 minutes, until mushroom juices evaporate. Add onion and stir often for about 10 minutes, until limp. Stir in paprika, tomatoes (and packing juice), broth, water, barley and red wine vinegar. Over high heat, bring mixture to boil. Reduce heat to simmer, cover and cook about 30 min., until barley is tender. Stir in 3/4 of parsley, ladle into bowls; sprinkle with remaining parsley just before serving. Salt and pepper to taste.

### **Suggestions for cooking with shiitake**

- Virtually any recipe, including those calling for button mushrooms, will be improved with shiitake (eg. soups, stews, egg dishes).
- Consider grilling or broiling large shiitake basted with a mixture of olive oil, crushed garlic and soy sauce.

### **Zucchini Cheese Mushroom Custard** *J. Mihail*

- 2 T. butter or margarine
- 4 eggs
- 8 oz. shredded Monterey jack cheese (or cream cheese)
- 4 oz. shredded cheddar cheese
- 1/2 cup seasoned dry bread crumbs
- 2 cloves garlic, pressed

- 2 T.     grated onion
- 4 C.     coarsely shredded zucchini
- 1 C.     grated Parmesan cheese
- 1         small can green chiles
- finely diced shiitake

Coat bottom and sides of a shallow 2.5-quart baking dish with the butter. Beat eggs in large mixing bowl. Stir in cheeses, bread crumbs, garlic, onion, chiles and mushrooms until well blended. Fold in the zucchini. Scoop the mixture into the buttered baking dish. Smooth the top and sprinkle with Parmesan cheese. Bake uncovered in a 350 degree oven until top is well browned and center is firm (about 45 minutes). Cool 10 minutes before serving. Makes 8 to 10 servings.



## Additional Resources for Shiitake Production

### Internet Resources: Supplies and Information

Field & Forest Products, Inc. Growers' information, starter kits, spawn, cultivation tools and related products. [www.fieldforest.net/](http://www.fieldforest.net/) (800) 792-6220.

Ozark Forest Mushrooms. Commercial production of shiitake and other gourmet mushrooms. Growing process information and examples of value-added products. [www.ozarkforest.com](http://www.ozarkforest.com) (314) 531-9935.

Royse, D.J. Cultivation of Shiitake on Natural and Synthetic Logs. Penn State University. <http://pubs.cas.psu.edu/FreePubs/pdfs/ul203.pdf>

The Shiitake Mushroom Center. <http://www.shiitakecenter.com/index.html>

"The Mushroom Growers' Newsletter" is available at [www.mushroomcompany.com](http://www.mushroomcompany.com)

### Internet Resources: Forest Management

University of Missouri Forestry Extension: <http://extension.missouri.edu/explore/agguides/forestry>

Forest Management for Landowners, Missouri Department of Conservation: [www.mdc.mo.gov/forest/library/](http://www.mdc.mo.gov/forest/library/)

Optimum site conditions for North American tree species, United States Forest Service: [www.na.fs.fed.us/spfo/pubs/silvics\\_manual/table\\_of\\_contents.htm](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm)

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Gold, M.A., M.M. Cernusca, and L.D. Godsey. 2008. A Competitive Market Analysis of the U.S. Shiitake Mushroom Marketplace. HortTechnology 18(3): 489-499.

Kimmons, T.E., M. Phillips, and D. Brauer. 2003. Small farm scale production of aerobic compost from hardwoods predigested by *Lentinula edodes*. Journal of Sustainable Agriculture 23: 109-123.

### DVD

Agroforestry Five-Practices DVD (Forest Farming section). University of Missouri Center for Agroforestry. Available for purchase online at <http://www.centerforagroforestry.org/pubs/index.asp#dvd>

### Associations

The North American Mycological Association: Includes an annual directory and bimonthly newsletter. [www.namycology.org](http://www.namycology.org)

The Mushroom Council: Marketing and consumer trend information. [www.mushroomcouncil.org](http://www.mushroomcouncil.org)



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2nd edition; updated 2008



# MUSHROOM CULTIVATION AND MARKETING

HORTICULTURE PRODUCTION GUIDE

**Abstract:** The market for mushrooms continues to grow due to interest in their culinary, nutritional, and health benefits. They also show potential for use in waste management. However, as fungi, mushrooms have life cycles very different from those of green plants. The choice of species to raise depends both on the growth media available and on market considerations. Oyster mushrooms, which grow on many substrates, are easiest for a beginner. Shiitake mushrooms already have earned considerable consumer demand. Only two mycorrhizal mushrooms, morels and truffles, have been commercially cultivated. Mushroom cultivation offers benefits to market gardens when it is integrated into the existing production system. A careful analysis of potential markets must be the first step in deciding whether to raise mushrooms to sell. Many information resources are available for further research.

By **Alice Beetz** and **Michael Kustudia**  
 NCAT Program Specialists  
 July 2004  
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## Introduction

Small-scale mushroom production represents an opportunity for farmers interested in an additional enterprise and is a specialty option for farmers without much land. This publication is designed for market gardeners who want to incorporate mushrooms into their systems and for those farmers who want to use mushroom cultivation as a way to extract value from woodlot thinnings and other “waste” materials. Mushroom production can play an important role in managing farm organic wastes when agricultural and food processing by-products



Gray Oyster Mushrooms • Glen Babcock – Garden City Fungi

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are used as growing media for edible fungi. The spent substrate can then be composted and applied directly back to the soil. This publication includes resources for entrepreneurs who wish to do further research.

Many people are intrigued by mushrooms' nutritional and medicinal properties, in addition to their culinary appeal. Mushrooms contain many essential amino acids; white button mushrooms, for example, contain more protein than kidney beans. Shiitake mushrooms are less nutritious, but are still a good source of protein. (Royse and Schisler, 1980) As a group, mushrooms also contain some unsaturated fatty acids, provide several of the B vitamins, and vitamin D. Some even contain significant vitamin C, as well as the minerals potassium, phosphorus, calcium, and magnesium. (Park, 2001)

Asian traditions maintain that some specialty mushrooms provide health benefits. Chinese doctors use at least 50 species. Two recent books, *Medicinal Mushrooms: An Exploration of Tradition, Healing and Culture* and *Medicinal Mushrooms You Can Grow*, detail existing research on the health benefits of mushrooms. See the **Resources** section at the end of this guide for specifics on these books and other sources of information.

Mushroom production is labor- and management-intensive. Specialty mushrooms are not a "get rich quick" enterprise. On the contrary, it takes a considerable amount of knowledge, research, planning, and capital investment to set up a production system. You must also be

Producing nutritious food at a profit, while using materials that would otherwise be considered "waste," constitutes a valuable service in the self-sustaining community we might envision for the future.



prepared to face sporadic fruiting, invasions of "weed" fungi, insect pests, and unreliable market prices.

## Growing Mushrooms

Mushroom production is completely different from growing green plants. Mushrooms do not contain chlorophyll and therefore depend on other plant material (the "substrate") for their food. The part of the organism that we see and call a mushroom is really just the fruiting body. Unseen is the mycelium – tiny threads that grow throughout the substrate and collect nutrients by breaking down the organic material. This is the main body of the mushroom. Generally, each mushroom species prefers a particular growing medium, although some species can grow on a wide range of materials.

If you are considering mushroom production, become thoroughly familiar with the life cycles of fungi. A very general description is included below. A plant pathology textbook is a good resource for learning more about these complex life cycles.

Once you are familiar with the various fungi life cycles, learn the growth requirements of each of the species you are considering. Two basic references are *The Mushroom Cultivator*, by Stamets and Chilton, and the aforementioned *Growing Gourmet and Medicinal Mushrooms*, by Stamets (see **Resources**).

Growing mushrooms outdoors as a part of a market garden involves little effort after you have inoculated the logs or other substrate with the mushroom spawn. Your duties are mainly to maintain humidity and monitor for fruiting. When mushrooms appear, you add them to your other garden products and sell them. (See *Mushrooms on the Farm and in the Garden*, below.)

Most available markets, however, require more mushrooms than occasional fruiting provides. Indoor production can fill the gaps when outside fruiting lags. The entire operation can also be conducted inside. However, indoor mushroom production demands a much higher level of knowledge, continuous monitoring, and timely manipulation of environmental conditions.

These are the steps in mushroom production— a cycle that takes about 15 weeks (time varies by species) from start to finish.

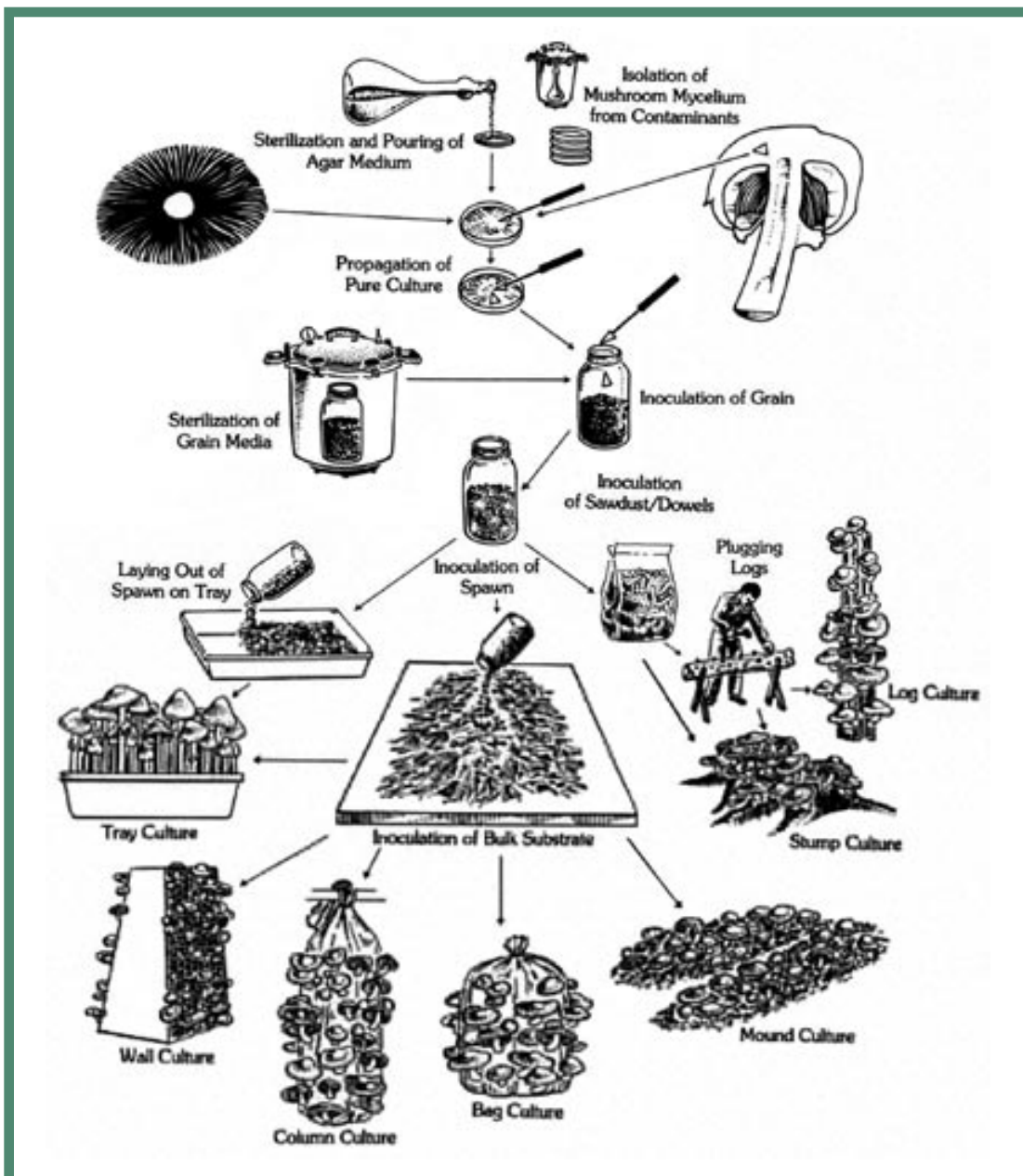
- Choosing a growing medium
- Pasteurizing or sterilizing the medium
- Seeding the beds with spawn (material from mature mushrooms grown on sterile media)
- Maintaining optimal temperature, moisture, and other conditions for mycelium growth and the conditions that favor fruiting (This is the most challenging step.)
- Harvesting, packaging, and selling the mushrooms

- Cleaning the facility and beginning again (Cooner, 2001)

The substrate on which the mushrooms will fruit must be sterilized or pasteurized in order to destroy any fungal and/or bacterial competitors. Low-tech substrate preparation methods are described in the books by Paul Stamets and by Peter Oei (see **Resources**).

To produce spawn, you inoculate a pasteurized medium, usually grain, with the sterile culture of a particular mushroom species. After the culture has grown throughout the medium, it is called spawn. Producing spawn requires exacting laboratory procedures. Terri Marie Beauséjour,

Figure 1



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cultivation chair for the Mycological Society of San Francisco, has written an excellent article that can help the beginner who is put off by the technical aspects of mushroom cultivation. Titled "Getting Started with Mushroom Cultivation: The Wisdom of Simplicity," it is available on the Web at <[www.mykoweb.com/articles/cultivation.html](http://www.mykoweb.com/articles/cultivation.html)>.

Many mushroom suppliers sell several kinds of spawn, and the beginning mushroom farmer should take advantage of this selection in early trials to determine which species grow best on available materials. Eventually, learning to produce spawn might reduce your cost of produc-

tion. Evaluate this possibility only after you have mastered the later stages of cultivation.

While the mycelium is growing—and until it fully occupies the substrate—the mushroom farmer typically manipulates the growing environment to favor mycelial growth. The atmospheric conditions are then changed to initiate "pinheads," and then to complete fruiting. For example, in oyster mushroom production under closely controlled conditions, the grower lowers the temperature and the CO<sub>2</sub> in the grow room to initiate fruiting. Each species has specific requirements for its stages of development. *The Mushroom Cultivator* provides detailed

## Mushrooms in Permaculture\* Design

*\*Permaculture is a system of combining perennials, trees, shrubs, and vines to create a "permanent agriculture." Using an intensive design process, the natural elements of an ecosystem are replaced by food-producing relatives, creating an edible landscape.*

Paul Stamets was an early advocate of integrating a variety of mushrooms into a permaculture system. (Stamets, 1994) In his design, agricultural wastes like cornstalks, wheat straw, or rice straw can be used as growing media for oyster mushrooms. After harvest, the spent substrate can be recycled as fodder or mulch for garden soils.

Shaggy manes (*Coprinus comatus*), Stamets notes, do well on manured soils and near compost piles. The King stropharia or wine cap mushroom (*Stropharia rugoso-annulata*) grows best outdoors and plays a key role as a recycler of woody debris. Bees, attracted to the sweet mycelium, help pollinate the green garden plants. The mushrooms are good to eat when small. Large, mature mushrooms attract fly larvae that make excellent fish or poultry food. These can supplement feed for other on-farm enterprises or be sold to pet stores.

Stamets also uses King stropharia mushrooms for their ecological benefits. He found that, when established along

waterways, they acted as microfilters of fecal coliform bacteria generated by his small herd of cattle. He also planted them along greywater runoff areas. Stamets believes mushrooms can play a large role in mycofiltration. (Stamets, 2000-2001)

Stamets grows shiitakes, namekos (*Pholiota nameko*), and Lion's mane (*Hericium erinaceus*) mushrooms on inoculated logs set in a fence row, while other species like maitake (*Grifola frondosa*), reishi (*Ganoderma lucidum*), and clustered wood-lovers are cultivated on stumps as part of a hardwood forest management system. He introduces mycorrhizal species such as chanterelles, King boletes, and others to new areas by "satellite planting," in which seedlings are planted near trees that have a desired mushroom species growing around them. After several years, the seedlings and their mycorrhizal associates are transplanted, creating new patches of mushrooms. Morels are more difficult to propagate, but some types can be encouraged through the use of small burns.



information on the requirements for 16 species.(Stamets & Chilton, 1983)

When you can cut the time between harvests, annual production increases. Short cycles are what large-scale commercial producers aim for, constantly looking for ways to increase efficiency. This is the competition you face if you plan to sell your product on the wholesale market.

Paul Stamets of Fungi Perfecti, an educational and mushroom supply company (See **Resources**), has spent most of his life studying the growth and cultivation of fungi. His book *Growing Gourmet & Medicinal Mushrooms* (see **Resources**) is an invaluable resource for anyone considering the cultivation of any mushroom species. He describes several alternative methods of producing mushrooms, including growing them outdoors on logs, on stumps, and in the garden, as well as indoors in bags or on columns.

Peter Oei, in his *Manual on Mushroom Cultivation* (see **Resources**), describes in some detail how alternative mushroom production systems have been used successfully in developing countries. Many ideas for low-input systems are included. In practice, it is unlikely that the beginner can successfully compete in the wholesale market against highly capitalized and efficient mushroom companies. A better choice for the beginner is to develop a niche market for high-quality fresh mushrooms, then sell them at retail, or to produce a value-added mushroom product, such as a soup mix or sauce.

## Mushrooms on the Farm and in the Garden

Fungi cycle nutrients that nourish new life in the soil. Recognizing this essential function, inventive gardeners integrate mushrooms into farm, garden, and permaculture systems. Mushrooms can also be grown in lawns, polytunnels, vegetable gardens, and woodlands.(Edwards, 2000)

Terri Marie Beauséjour, a writer for *Mushroom the Journal*, encourages creativity and imagination when planting mushrooms in a garden. Look at the “fungamentals,” she writes, the necessities such as available substrates, microhabitats, sun,

shade, wind, and humidity conditions. Gardens offer ample substrates—organic waste materials—while plants provide shade and humidity. Plug-inoculated blocks buried among plantings work well for oyster and *Stropharia rugoso-anulata* mushrooms. Beauséjour suggests using a misting sprinkler for mushrooms in gardens. (Beauséjour, 1999)

Grower and author Ken Litchfield notes that mulching, a standard gardening practice, not only regulates soil temperature and humidity but also nourishes fungi. He also suggests surrounding raised beds with partially buried logs to create mushroom habitats. Inside the beds, vegetables, flowers, and shrubs offer the requisite shade and humidity for mushroom cultivation. In weedy areas, Litchfield suggests putting down organic material and covering it with wet cardboard and wood chips, an ideal substrate for fungi.(Litchfield, 2002)

These methods of production are not likely to yield huge numbers of mushrooms. However, they can provide an attractive addition to directly marketed produce.

## Choosing a Mushroom Species

A mushroom cultivation kit (check with suppliers listed below) is a handy way to begin to understand the fungal life cycle. Once you successfully use the kit, you can begin to learn the steps that precede that final fruiting stage of the mushroom life cycle. Purchase spawn that will grow on materials you have available. Then design and test a system that duplicates the conditions favorable to all stages of growth. You can use this experience to learn how to create sterile cultures and spawn for the species you are growing.

Choose the species to grow by thinking about:

- What waste materials are readily available to use as a growth medium?
- What kind of facility or environment is available?

- How much will the necessary equipment cost?
- What level of skill is required to manage the life cycle of the fungus?
- What is market demand for this species?

According to these criteria, oyster (*Pleurotus species*) and shiitake (*Lentinus edodes*) mushrooms are probably best for most novices, although the maitake (*Grifola frondosa*) is also a possibility. The former two are relatively easy to grow, and there is already a market for them, largely because commercial producers of white button (*Agaricus bisporus*) mushrooms have been diversifying into specialty mushrooms. If you intend to grow mushrooms commercially, shiitake or oyster mushrooms are your best choices. These two species are more thoroughly covered in the following sections.

A chart in the **Appendix** lists other common species and the materials on which they can be cultivated. Test each species you are considering against each of the questions listed above.

## Species for Beginners

### Oyster mushrooms

Oyster mushrooms (*Pleurotus species*) are a good choice for beginning mushroom cultivators because they are easier to grow than many of the other species, and they can be grown on a small scale with a moderate initial investment. Although commonly grown on sterile straw from wheat or rice, they will also grow on a wide variety of high-cellulose waste materials. Some of these materials do not require sterilization, only pasteurization, which is less expensive. Another advantage of growing oyster mushrooms is that a high percentage of the substrate converts to fruiting bodies, increasing the potential profitability.



Flamingo Oyster Mushrooms • Glen Babcock – Garden City Fungi

Oyster mushrooms can become an integral part of a sustainable agriculture system. Many types of organic wastes from crop production or the food processing industry can be used to support oyster mushroom production.

Although there are no books devoted entirely to oyster mushroom production, Stamets' books provide basic information. Research on using various agricultural and forest wastes as substrates is reported in the recently published *Mushroom Biology and Mushroom Products*, edited by D.J. Royse. (Royse, 1996) Peter Oei (Oei, 1991) documents a number of commercial production systems for some strains grown in developing countries.

There is an increasing number of Web sites devoted to oyster mushroom production. Lawrence Weingarten describes his production process on his Web site, complete with photos at <[www.mycowest.org/cult/i-grow/i-grow-1.htm](http://www.mycowest.org/cult/i-grow/i-grow-1.htm)>.

Two Canadian Web sites also offer additional advice:

- Oyster Mushroom Cultivation  
[www.gov.ns.ca/nsaf/elibrary/archive/hort/vegetables/pihve94-03.htm](http://www.gov.ns.ca/nsaf/elibrary/archive/hort/vegetables/pihve94-03.htm)



Golden Oyster Mushrooms • Glen Babcock – Garden City Fungi

- Growing Shiitake & Oyster Mushrooms on Hardwood Logs  
[www.fallsbrookcentre.ca/webmain/programs/Forest/Pamphlet.htm](http://www.fallsbrookcentre.ca/webmain/programs/Forest/Pamphlet.htm)

The MushWorld Web site, <[www.mushworld.com/home](http://www.mushworld.com/home)>, contains excellent technical information about growing oyster mushrooms. The site requires registration, but it is free.

Oyster mushroom cultivation has one significant drawback: some people are allergic to the spores. In these cases, air-cleaning equipment or respirators are necessary in order to safely work in the production facility.

The consumer market for oyster mushrooms is being developed by the larger mushroom companies as they diversify their operations. However, because of the short shelf life of many oyster mushroom varieties, this species may offer a special advantage to the local grower who markets directly and can consistently deliver a fresh, high-quality product.

## Shiitake mushrooms

Shiitakes (*Lentinus edodes*) are well suited as a low-input alternative enterprise because they, like oyster mushrooms, can be grown on a small scale with a moderate initial investment. Shiitake cultivation has been thoroughly investigated, and a commercial market already exists in most areas of the United States. Shiitake mushrooms are

grown on logs, either inside or outside. Inside, they can also be grown on compressed sawdust logs or in bottles or bags. See the brief description of these production systems below. Several excellent books and Web sites are also listed below in **Resources (shiitake)**.

## Log Production

Hardwood logs approximately 4" to 6" in diameter and of an easily handled length (commonly four feet) are cut during a tree's dormant season. Oaks, sweetgum, cottonwood, beech, birch, willow, and other non-aromatic hardwoods are appropriate species. The denser woods produce for up to twice as long as the softer ones. Smaller diameter logs produce more quickly than larger ones, but for a shorter time.

Handle the logs carefully to avoid soil contact and damage to the bark. This will help prevent contamination by competing fungi. Inoculate the logs with spawn from a strain suitable to your production system. There is a wide variety of spawn from which to choose and several inoculation methods.

After inoculation, the spawn develops a thread-like network – the mycelium – growing throughout the log. During this time, you must protect the logs from dehydration by the sun and wind. Spray or mist the logs to maintain the humidity necessary to keep the mycelium alive and growing. When the mycelium has fully occupied the logs and the temperature and humidity are right for fruiting, the mycelium will initiate tiny "pinheads" at the surface of the log. The pinheads grow into mushrooms in the next couple of days.

To stimulate fruiting, some growers soak the logs in water tanks and/or "shock" them by physical impact or chilling. Others leave the logs in the growing environment and harvest when they naturally fruit.

Be alert for signs that fruiting is beginning. The best grades of shiitakes have caps that still have a slight curl at the edge. Harvest often if you want to earn the best price for your mushrooms. In addition, if you want to deliver a premium product, you must pay attention to post-harvest storage, packaging, and shipping.

Many shiitakes are raised organically. Although it is easier to produce shiitakes organically than some of the other mushrooms, “weed” fungi, as well as pests such as slugs and flies, can reduce fruiting and quality. The producer must monitor, quickly identify, and control these pests or lose some of the crop.

Federal law now controls the use of the word “organic” in marketing. In order to label a product organic, producers must be certified by an accredited third party and document their production and handling practices. For further information, call and request the ATTRA publication *Organic Farm Certification & the National Organic Program*, or see it at our Web site, <[www.attra.ncat.org](http://www.attra.ncat.org)>.

### Growing Shiitakes on Sawdust

Today, most shiitakes and many other mushroom species are raised on a sterilized sawdust substrate. Although this method allows a much faster fruiting cycle and a high level of return (110% or more of initial dry weight), it also demands a greater capital investment and more skillful management than log production. In order to achieve fruiting as quickly as possible, you need a building in which you can control the temperature and moisture. The building must be easy to keep clean, and sanitary procedures must be strictly followed to avoid contamination.

The chamber and the steam processor to pasteurize or sterilize the sawdust can represent a significant initial investment. For example, Crop King sells a small mushroom production system, including an inoculation table and bagging station, for about \$5,000. The company’s complete growing system—including equipment, structural components, and technical support—can come to more than \$41,000. Recovering these costs is a challenge for a beginner—especially at current mushroom prices.



Shiitake mushrooms fruiting on sawdust • Glen Babcock - Garden City Fungi

However, innovative producers have used concrete mixers to blend supplemental ingredients and made pasteurized substrate in barrels. Fungi Perfecti sells pressure sterilizers for \$200 to \$1,000, but warns that they are not designed for commercial production.

Using hydrogen peroxide instead of conventional pasteurization is a relatively recent innovation. A manual on this method and more information is available at <[www.mycomasters.com/](http://www.mycomasters.com/)>.

Growing mushrooms on sawdust requires attention to detail—especially careful monitoring and timely processing of the blocks, bottles, or bags. Several of the books listed below, including Stamets (1993) and Przybylowicz and Donoghue (1990), offer more details about this production method.

### Shiitake Prices

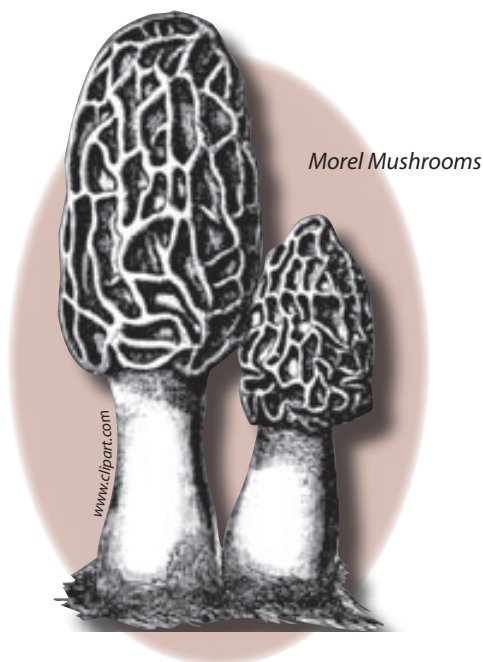
The price for shiitake mushrooms fluctuates throughout the season. Prices are highest in the winter when supply is low, and lowest in summer when production peaks. Except in very mild climates, the only logs that fruit in winter are those maintained indoors. Using strains selected to fruit at cooler temperatures can lengthen the

harvest season and allow producers to capture the higher prices. See the marketing section below for ways to counteract the natural price cycle.

### Sources of Further Information on Shiitakes

Several states, including Pennsylvania, California, and Oregon, support university research on shiitakes and may have Extension specialists who can provide information to growers in their states. Others have Extension publications with information specific to their areas. Some of these resources are available on-line at Web sites listed in the **Resources** section. An excellent example is the site maintained by the Ohio State University.

In states without this Extension support, one of the best ways to learn about production is to share information with other growers. There are several local grower organizations, many of which publish newsletters. Ask your state Extension horticultural specialist about local organizations, or you can contact the North American Mycological Association or the American Mushroom Institute (see **Resources**). There are also several books specifically about shiitake production. See **Resources (shiitake)** for more information.



## Other Mushroom Species

### Mushroom Species with Limited Commercial Production

Some species of mushrooms are not yet commercially cultivated. Many of these are mycorrhizal types; that is, they grow only in conjunction with the roots of a higher plant. Matsutakes and chanterelles are typical examples of such mushrooms.

Mycorrhizal mushrooms are the hardest to grow commercially, because the needs of both the fungus and the host plant must be met in order to produce a commercial crop. Also, the host plant typically must reach a certain physiological maturity before the fungus will fruit. When the host is a tree, this maturation may be measured in decades. Nevertheless, highly prized morels and truffles are mycorrhizal, and they are both now being grown commercially in the United States.

#### *Morels*

Commercial production of morels on anything but a small-scale, seasonal basis is currently not a practical option. Morels are being grown year-round, using a patented process, at only one production facility in North America (in Alabama). The patent and facility are owned by Terry Farms and represent the only successful commercial process for fruiting these highly valued mushrooms out of season.

It is, however, possible to establish a morel patch by using a morel starter kit. If you are successful, these mushrooms will fruit in the spring at the same time as wild morels. Morel prices are, understandably, at their lowest during this natural fruiting season. Adding them to a farmers' market stand would certainly attract more-loving customers. You can also dry the product for year-round sales if you can grow commercial quantities in your patch.

Tom Volk's Web site, <[http://botit.botany.wisc.edu/toms\\_fungi/morel.html](http://botit.botany.wisc.edu/toms_fungi/morel.html)>, has particularly good information about morel mushroom production.

#### *Truffles*

Growers generally begin truffle production by

dipping tree seedlings in a mycorrhizal slurry before planting. After several years, under favorable growing conditions for both the tree and the fungus, truffles form underground fruiting bodies that roughly resemble potatoes. These range from the size of a pea to that of a fist and give off a distinctive odor. Since these “mushrooms” don’t completely emerge from the ground, they have traditionally been sniffed out by pigs or trained dogs.

The requirements for growing the black Perigord truffle, *Tuber melanosporum* Vitt., include choosing an appropriate host plant (usually oak or hazelnut), inoculating its roots with the spawn, and planting it. Frank Garland planted his first inoculated trees in 1980 and harvested the first black truffles grown in the U.S. on October 23, 1993. He has written a production guide based on his experience. (Garland, 1996) Garland also has a consulting business and sells inoculated trees.

One Oregon tree farmer in prime white truffle country found a low-fuss method of cultivation. The white truffle, *Tuber gibbosum*, is a mycorrhizal species associated with Douglas fir and other conifers. This farmer uses a backpack sprayer to apply a slurry made of truffles and spores at the roots of conifers. The inoculated areas have produced between 300 to 1000 pounds per acre per year, significantly more than the unsprayed areas. (Arnold, 1996)

The truffle industry has developed rapidly in Australia and New Zealand. New Zealand’s efforts, as reported by Dr. Ian Hall, were begun in 1987, with harvest recorded on June 29, 1993, just months before Garland found his first truffles in North Carolina. (See <[www.fungifest.com/article1021.html](http://www.fungifest.com/article1021.html)>.) Australian researchers also report success in their cultivation efforts, summarized in several articles available on the Web. The articles are found by searching the following main pages for “truffle” or “*Tuber melanosporum*”:

- [www.crop.cri.nz](http://www.crop.cri.nz)
- [www.rirdc.gov.au/reports](http://www.rirdc.gov.au/reports)

*The Black Truffle* (Hall et al., 1994) is out of print, but it was converted to CD ROM format in 2001 and is available for NZ\$49.95 through the Internet at <[www.crop.cri.nz/psp/products/truffle.htm](http://www.crop.cri.nz/psp/products/truffle.htm)>. Chapters cover the symbiotic partnership between truffles and their host plants, his-

tory and folklore, cooking and recipes, how to establish and manage a plantation, climatic and soil requirements, and cultivation and harvesting.

Studies have revealed a lot about the conditions necessary to bring truffles to early fruiting and then to significant production levels. However, because of the crop’s extremely high value and because each success has required an investment of considerable time, it is understandable that some of this information is considered proprietary. Even when fruiting begins, growers themselves may not be able to accurately identify what contributed most to the truffles’ growth.

Each new truffle enterprise is an experiment based on what has already been reported. Check this Web site maintained by a group of scientists investigating truffle cultivation: <[www.truffle.org/tuber\\_directory/](http://www.truffle.org/tuber_directory/)>.

Consider combining the production of truffles with the sale of nuts from the host trees, growing annual or perennial crops between the trees, or grazing ruminants among them—sheep have been credited with increasing the French wild-harvested crop yield. (Ludmer-Gliebe, 1997) These or other agroforestry options could provide additional sources of income during early, non-fruiting years and in the seasons when truffles do not produce.

### Other Mycorrhizal Species

Mushroom researchers continue to investigate the cultivation of other species for the



commercial market. A loosely organized group of international scientists meets intermittently to share their research. The Web site maintained for this scientific endeavor is <[www.mykopat.slu.se/mycorrhiza/edible/home.phtml](http://www.mykopat.slu.se/mycorrhiza/edible/home.phtml)>.

Until commercial production systems are developed, mushrooms such as chanterelles and matsutake (pine) mushrooms will continue to be collected from the wild for sale to the specialty mushroom market. The harvest of wild mushrooms is strictly regulated in some states. Check with your state department of agriculture regarding laws that apply. You would be wise to carry liability insurance and to be absolutely certain of the identity of mushrooms you sell. Mistakes can be fatal to the consumer. Finally, the forest environment that supports the growth of wild mushrooms is a fragile one. Learn how to conduct your foraging business in a way that protects future harvests.

*Mushroom the Journal* (see **Resources**) provides excellent information on wild mushrooms. There are also many local mycological societies that schedule “forays” – trips to known mushroom habitats – where the inexperienced forager can learn about various species and how to identify them.

## Pest Management

Integrated pest management (IPM) is a least-toxic approach for managing any pest. IPM views pests as a natural part of the farm environment. The integrated management of a pest is accomplished by altering the environment to the disadvantage of that pest. In order to accomplish this, you have to be able to identify what pests are active, how many there are, and how many it takes to hurt your profits. If you know the life cycle of each problem organism, you can take measures to make it hard or impossible for it to complete its life cycle. You may be able to encourage natural enemies that will keep the population below the economically damaging threshold.

Here are some examples of non-chemical methods used to control typical pests in the production of white button mushrooms. Mushroom flies, a common pest among many cultivated mushrooms, are attracted to the smell of decaying vegetation such as mushroom substrates. Screen-

ing the mushroom house ventilation system will keep adult flies out. Double doors and positive atmospheric pressure within the structure also prevent flies from entering. Since adult fungus flies are drawn to standing pools of water on benches, walks, or floors, places where water can collect should be eliminated. Biocontrol is another option for several mushroom pests, the sciarid fly among them. A predatory nematode attacks this fly in its larval form. Therefore, this nematode can be added to the composting substrate to prevent infestation.

For a better understanding of IPM, see the ATTRA publication *Biointensive Integrated Pest Management*. It describes IPM methodology and provides extensive resources for further research.

Each mushroom species in a specific environment has a different pest complex. Because specialty mushroom production in this country is still very new, many pests have not received research attention. Most pests you are likely to encounter, however, have probably already been studied. In any case, you will probably have to design your own pest management system. Stay alert for any evidence of damage to the fruiting mushrooms and act quickly to identify its cause. Use whatever information you can find, along with your own creativity, to devise ways to protect your crop.

Use all the resources you can find – in libraries, at bookstores, or on the Web. Local Extension agents or state Extension specialists can help identify pests and, possibly, determine economic thresholds. They can also help you find biological controls, if cultural and mechanical methods fail.

## Marketing Mushrooms

Marketing is the most important consideration of all. If you can't sell your mushrooms at a price that ensures a reasonable profit margin, you don't want to invest in this enterprise. Spend some time – and even some money – educating yourself about marketing your potential product.

This section provides a broad overview of market trends, some ideas about how to research potential markets, references to useful resources,

suggestions about marketing channels, and advice on financial analysis.

Market research and evaluation is perhaps the most challenging part of developing a new enterprise. Luckily, there are many helpful sources. A good place to start is ATTRA's Marketing and Business series, particularly *Direct Marketing* and *Evaluating a Rural Enterprise*. These publications detail the market evaluation process and include extensive resource lists. Other relevant ATTRA publications cover market gardening, value-added products, and agri-tourism. You can find the marketing publications on the ATTRA Web site at <<http://attra.ncat.org/marketing.html>>, or call 800-346-9140 to have them sent to you.

The many Web sites listed in **Resources** (below) will help you find information to further your market research. Another resource, as you analyze the potential for a mushroom business, is your local Small Business Administration office. Not only do they have helpful publications, they also provide some one-on-one assistance.

## Market Demand

Some 260 U.S. growers produced more than 844 million pounds of mushrooms in 2002-03, with a farm gate value of \$889 million. (Certified organic mushrooms accounted for only 1 percent of all sales, although 12 percent of growers were certified organic.) The vast bulk of sales were of the *Agaricus* species, which includes white button mushrooms, portobellas, and criminis. The latter two are a brown strain of *Agaricus bisporus*, whose cultivation is managed for extra large (portobella) and very small (crimini) fruiting bodies. (Current statistics are found at <<http://usda.mannlib.cornell.edu/reports/nassr/other/zmu-bb/>>.)

Large, well-established companies produce virtually all *Agaricus* mushrooms; most are located in Pennsylvania and California. Their production houses are full of mushrooms in every stage of development. Mushrooms raised in these systems can be sold profitably on the wholesale market. It is very difficult for a beginning grower to compete with these companies at wholesale prices.

## The Mushroom Business

Stella K. Naegely writes in the *American Vegetable Grower* that the key to the mushroom business is to have established buyers and be capable of consistent production. New growers might encounter an uphill educational experience for two or three years. Launching a commercial mushroom operation can cost between \$50,000 and \$250,000, depending on whether a grower starts with an appropriate building. For that reason, it is prudent to start small. Naegely offered the following business tips for people contemplating commercial production. (Naegely, 2000)

- Make the market drive your production. Talk to potential buyers about volume and prices.
- Explore various marketing options: brokers, distributors, farmers' markets, restaurants, grocery stores, food service operations, and co-ops.
- Consider reselling other growers' mushrooms to offer more variety and larger volume.
- Talk to other producers and perhaps a consultant about production systems.
- Consider buying used equipment to reduce initial capital investment.
- Strike a balance between undercapitalizing and a heavy debt load.

## Market Research

The goals of market assessment are to project the sales volume and gross income of a new enterprise, to analyze its potential profitability and cash flow, and to gather information about potential buyers and competitors (to help develop a market strategy).

Many specialty mushrooms can be cultivated, but the market, though growing, is still limited. If you are thinking about starting a commercial mushroom enterprise, begin at the end: to whom will you sell them? You cannot make money in any business if you don't have buyers for your product. Learn who buys mushrooms, what



kinds they want, and where they shop. You must thoroughly investigate the demand for each mushroom species or product— as well as the available marketing outlets— before committing large amounts of capital to the enterprise.

Check the local situation on your own. Some common methods for conducting initial research include observation of buyers, surveys of stores, personal interviews with growers, and test marketing (once you have an experimental product). Another function of market research is to evaluate the competition. This will help you determine what market already exists and identify any niches you could fill. To find out more about your competitors, use their products. Talk to them. You may be surprised how much information they will share.

### Market Channels

Explore as many marketing strategies as appeal to you. Below are some possibilities.

- Market the fresh or dried product directly to your customers (at farmers’ markets, to gourmet chefs, over the Internet, through mail-order offerings)
- Add value to the mushroom by creating processed products (mushroom sauces, dried entrée mixes, teas, extracts)

Shiitake mushrooms harvested from sawdust  
Glen Babcock – Garden City Fungi



- Wholesale as fresh produce (on contract or by the batch)

### Direct marketing

If you can sell your mushrooms or mushroom products directly to an end user, you will naturally receive a better price than if you sell to a wholesaler. Direct marketing of mushrooms at local farmers’ markets, to restaurants, or in supermarkets is possible in many locations. When competing in local markets, excellent service, top quality, and consistent supply, rather than the lowest price, might win the sale, particularly with gourmet chefs. Some chefs specialize in locally grown foods and may be interested for that reason. Others are willing to pay for fresh, premium produce. In any case, establishing a relationship with the buyer and reliably delivering a quality product are essential for this type of marketing.

Local grocery stores are another potential buyer of fresh mushrooms. However, an Arkansas grower found that local grocery chains were interested in her shiitake mushrooms only if she could assure them of a year-round supply. She decided that she had to add indoor production in order to meet this requirement. Natural foods stores are a market that may be more tolerant of seasonal supply. Any chef or grocer will require assurances of both quality and regular supply before switching from established wholesale sources.

Although the wholesaler with an established account creates stiff competition, the small, efficient producer might still have an advantage in some niche markets. For instance, shiitakes grown on logs are generally of higher quality and have a longer shelf life than shiitakes grown on sawdust substrates (the most common mass-production method). Log-grown shiitakes earn prices from three to eight times higher than those grown on sawdust substrates. (Anon., 2003) Find the buyer to whom

quality matters, and you will have found a market for your product.

Locally-grown oyster mushrooms have an advantage because oysters have a very limited shelf life and are too fragile to ship easily. The grower with direct, local sales can supply a fresher product that arrives in better condition.

### Wholesale markets

Selling fresh mushrooms to a wholesaler will mean a lower price than if you market directly. However, for growers who choose not to involve themselves in direct sales, there are established wholesale markets for mushrooms. Wholesalers advertise in produce industry periodicals like *The Packer*. Your local librarian or an Internet search can help you locate other such magazines.

Mr. Paul Goland of Hardscrabble Enterprises maintains that there is a steady and growing market for quality dried shiitakes, even though the wholesale market has been depressed by Chinese imports. His buyers—natural foods stores and co-ops—do not buy the Chinese products. He buys several grades of dried shiitakes from growers who ship directly to West Virginia. Contact Paul Goland (see **References**) to learn whether he has a current demand for your product.

Small-scale commercial production of white button mushrooms and other *Agaricus* varieties such as portobellas and criminis is not recommended for the beginner, except on a small scale for direct marketing. A significant capital outlay and a high level of management skills are required to begin production, and at current prices, recovery of the initial investment might not be possible. The market is extremely competitive. More information about the button mushroom business is available from The American Mushroom Institute (see **Resources**).

### Adding Value to Fresh Mushrooms

Adding value to fresh mushrooms usually means either developing a processed product, such as a sauce, or drying surplus mushrooms for sale in the off-season, when prices are higher. A value-added product can be sold either directly to the consumer or to wholesalers.

The Persimmon Hill Berry Farm in Missouri (see **References**) offers an example of how a small entrepreneur can create and market a value-added mushroom product. Persimmon Hill developed a recipe for a shiitake mushroom sauce and invested in a commercial kitchen to produce it. The farm buys from local growers who, since the mushrooms are not for the fresh market, can freeze them until they have enough to make a delivery to the processing kitchen worthwhile. During warm weather, when production peaks, they can likewise freeze the shiitakes until Persimmon Hill needs them. These growers receive a better price than they would if they were selling at the lower, peak-season prices, and Persimmon Hill is ensured a steady supply for its sauce. Persimmon Hill sells its products on the Internet and through direct sales on the farm. (See [www.branston.com/persimmonhill/](http://www.branston.com/persimmonhill/).)

Drying shiitakes and other mushrooms is another way to add value and avoid the low prices of the peak season. For more on drying technologies, see the ATTRA publication *Options for Food Dehydration*. (After drying, mushrooms should be held at 0° F. for four days to kill any surviving pest eggs.)

## Financial Analysis

As a part of your market research, you need to do a financial analysis of the potential enterprise. Develop an enterprise budget with as much detail as you can provide. As with many farm enterprises, mushroom production is often only marginally profitable when labor and management costs are taken into consideration. An example of an enterprise budget for shiitake

Only by developing a market niche for a high-quality fresh product or by producing a mushroom-based food item can a small-scale beginner hope to compete.

## Case Study: Marketing Key for Small-Scale Growers

In the Ozarks of Missouri, Nicola MacPherson and her husband, Daniel Hellmuth, have grown shiitakes on three acres for nine years. The couple grow them the traditional way on oak logs, and they market them under the label Ozark Forest Mushrooms, which carries a USDA organic seal. To sell their mushrooms, however, they've relied on a variety of nontraditional marketing approaches. "To promote sales, you must be prepared to promote your product tirelessly," MacPherson says. Their principal markets are up-scale restaurants, catering companies, and gift catalogs. Customers who demand organic produce, such as CSA (Community Supported Agriculture) subscribers, also provide a reliable market.

MacPherson urges beginners to start modestly, learn the process thoroughly, and develop a small, reliable customer base—say, a half-dozen regular customers—as a foundation. (She offered free samples to help establish a local market.) She cautions new growers not to create a market demand that they cannot meet. Selling to supermarkets, for instance, can be fraught with problems, including the challenge of ensuring product freshness and the recurring need for educating new produce department employees. (Anon., 1998)

log production is available at <[www.ext.vt.edu/pubs/vegetables/438-898/shiitakemushrooms.pdf](http://www.ext.vt.edu/pubs/vegetables/438-898/shiitakemushrooms.pdf)>.

Using this format or a generic enterprise budget from Extension offices or off the Internet, fill it in with as many actual calculations and estimates of costs as you can. If you are considering several mushroom species, do a financial analysis of each one separately. Try to anticipate every cost so that you can construct an accurate financial picture. Include an educational and/or marketing component in your budget, allowing for free samples or flyers with information and recipes, especially if you are developing a new product or will be doing direct marketing.

If you are adding mushroom production to an integrated farming system, financial analysis is more difficult. Making a clear profit might not be as important as making use of off-season labor or the small logs from woodlot thinning to create a saleable product from what otherwise would have been waste.

## Further Resources

Two periodicals that include mushroom cultivation information are *The Mushroom Growers' Newsletter* and, to a lesser degree, *Mushroom the Journal*. Subscription information is included, along with citations for several key books, in the Resources section below. Web sites devoted to mushrooms and their cultivation are increasing every year. A selected list of mushroom Web sites is included below.

Some state or local mycological societies have groups interested in mushroom cultivation. To locate chapters in your area, contact the North American Mycological Association (see Resources).

## Conclusion

Commercial cultivation of mushrooms is not for everyone. It requires someone who is familiar with fungi life cycles and willing to commit time and money to research, designing a system, and developing a business. The mushroom cultivator must be able to carry out operations on time, be attentive to details, and be vigilant about pest invasions. In most cases, marketing requires excellent public relations skills.

Nevertheless, there is potential for an innovator who can use an existing facility, obtain a low-cost substrate, and produce a reliable supply of a high quality product. As part of a whole-farm system, mushrooms can augment productivity at any scale. Producing a nutritious food at a profit, while using materials that would otherwise be considered "waste," constitutes a valuable service in the self-sustaining community we might envision for the future. It is a challenge some will find worth taking.

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- Available for \$15 from:  
Garland Gourmet Mushrooms and Truffles, Inc.  
3020 Ode Turner Rd.  
Hillsborough, NC 27278  
919-732-3041  
919-732-6037 FAX  
truffleman@mindspring.com
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- Hall, Ian R., G. Brown, and J. Byars. 1994. *The Black Truffle*. Rural Industries Research and Development Corporation. New Zealand. 107 p.
- Hardscrabble Enterprises, Inc.  
P.O. Box 1124 (or 617 N. Main St.)  
Franklin, WV 26807  
304-358-2921  
hardscrabble@mountain.net  
Contact: Paul Goland
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- Oei, Peter. 1991. *Manual on Mushroom Cultivation*. TOOL Foundation, Amsterdam. p. 49-50. (A new edition of this book is now available; see **Resources**.)
- Persimmon Hill Berry Farm  
RR 1, Box 220  
Lampe, MO 65681  
417-779-5443
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# Appendix

## Mushroom Cultivation Media

Growing Medium	Mushroom Species	
Rice Straw	Straw ( <i>Volvariella</i> ) Common ( <i>Agaricus</i> )	Oyster ( <i>Pleurotus</i> )
Wheat straw	Oyster ( <i>Pleurotus</i> ) Stropharia	Common ( <i>Agaricus</i> ) Straw ( <i>Volvariella</i> )
Coffee pulp	Oyster ( <i>Pleurotus</i> )	Shiitake ( <i>Lentinus</i> )
Sawdust	Shiitake ( <i>Lentinus</i> ) Ear ( <i>Auricularis</i> ) Maitake ( <i>Grifola frondosa</i> ) Lion's Head or Pom Pom ( <i>Hericium</i> )	Oyster ( <i>Pleurotus</i> ) Ganoderma ( <i>Reishi</i> ) Winter ( <i>Flammulina</i> )
Sawdust-straw	Oyster ( <i>Pleurotus</i> )	Stropharia
Cotton waste from textile industry	Oyster ( <i>Pleurotus</i> )	Straw ( <i>Volvariella</i> )
Cotton seed hulls	Oyster ( <i>Pleurotus</i> )	Shiitake ( <i>Lentinus</i> )
Logs	Nameko ( <i>Pholiota</i> ) White jelly ( <i>Tremella</i> )	Shiitake ( <i>Lentinus</i> )
Sawdust-rice bran	Nameko ( <i>Pholiota</i> ) Shaggy Mane ( <i>Coprinus</i> ) Shiitake ( <i>Lentinus</i> )	Ear ( <i>Auricularis</i> ) Winter ( <i>Flammulina</i> )
Corncoobs	Oyster ( <i>Pleurotus</i> )	Shiitake ( <i>Lentinus</i> )
Paper	Oyster ( <i>Pleurotus</i> )	Stropharia
Horse manure (fresh or composted)	Common ( <i>Agaricus</i> )	
Crushed bagasse and molasses wastes from sugar industry	Oyster ( <i>Pleurotus</i> )	
Water hyacinth/Water lily	Oyster ( <i>Pleurotus</i> )	Straw ( <i>Volvariella</i> )
Oil palm pericarp waste	Straw ( <i>Volvariella</i> )	
Bean straw	Oyster ( <i>Pleurotus</i> )	
Cotton straw	Oyster ( <i>Pleurotus</i> )	
Cocoa shell waste	Oyster ( <i>Pleurotus</i> )	
Coir	Oyster ( <i>Pleurotus</i> )	
Banana leaves	Straw ( <i>Volvariella</i> )	
Distillers grain waste	Lion's Head or Pom Pom ( <i>Hericium</i> )	

## RESOURCES

### Periodicals

*The Mushroom Growers' Newsletter* is a monthly newsletter that contains cultivation information and current prices of mushrooms at San Francisco and New York markets.

Available for \$35/year from:  
The Mushroom Growers' Newsletter  
P.O. Box 5065  
Klamath Falls, OR 97601  
[www.mushroomcompany.com/](http://www.mushroomcompany.com/)

*Mushroom the Journal* is a quarterly publication that primarily contains information on foraging, with limited information on cultivation.

Available for \$19/year from:  
Leon Shernoff  
1511 E. 54th St.  
Chicago, IL 60615  
[www.mushroomthejournal.com/index.html](http://www.mushroomthejournal.com/index.html)

### Bibliography

The National Agricultural Library (NAL) has published several Quick Bibliographies (QBs), results of database searches on a given topic. QBs have been published for both shiitake and oyster mushrooms. They can be downloaded from the NAL Web site.

[www.nal.usda.gov/afsic/afspub.htm](http://www.nal.usda.gov/afsic/afspub.htm)

### Books

Stamets, Paul, and J.S. Chilton. 1983. *The Mushroom Cultivator*. Agarikon Press, Olympia, WA. 415 p.

*Includes growing parameters for 16 species and covers every aspect of mushroom cultivation.*

Available for \$29.95 from:  
Fungi Perfecti  
P.O. Box 7634  
Olympia, WA 98507  
800-780-9126 (toll-free) or 260-426-9292

Stamets, Paul. 1993. *Growing Gourmet and Medicinal Mushrooms*. Ten Speed Press. Berkeley, CA. 592 p.

*Companion volume to The Mushroom Cultivator. This third edition updates cultural and growing techniques, adds growing information on new varieties, and discusses strain selection for cultivation.*

Available for \$44.95 from Fungi Perfecti (See address above.)

Oei, Peter. 2003. *Manual on Mushroom Cultivation: Techniques, Species and Opportunities for Commercial Application in Developing Countries*. TOOL Publications, Amsterdam, The Netherlands. 274 p.

*First published in 1991, and now completely updated, this guide offers information on growing 12 species of mushrooms, with a particular emphasis on growing in developing countries. The manual includes 71 drawings, 93 photo illustrations.*

Available for \$53.50 plus \$8 for shipping from:

Western Biologicals, Ltd.  
P.O. Box 283  
Aldergrove, BC V4W2T8  
Canada  
604-856-3339 (telephone or FAX)  
[western@iprism.com](mailto:western@iprism.com) or [westernb@shaw.ca](mailto:westernb@shaw.ca)

Also available to developing countries from C-Point Publishers in the Netherlands. For ordering information, contact Ine Klerkx, <[ine.klerkx@cpoint.nl](mailto:ine.klerkx@cpoint.nl)>.

Hadeler, Hajo. 1995. *Medicinal Mushrooms You Can Grow*. The Cariaga Publishing House. 196 p.

*Excellent guide to wood-loving mushroom cultivation, from plugging old stumps to enriched sawdust culture in sterile bags. Covers medicinal species well. Well written and illustrated; index.*

Out of print, but some are still available from [amazon.com](http://amazon.com)

Hobbs, Christopher, and Michael Miovic (ed.). 1995. *Medicinal Mushrooms: An Exploration of Tradition, Healing and Culture*. Third

Edition. Botanical Press, Santa Cruz, CA.  
252 p.

*Mushroom toxicity, use in traditional medicine and in the human diet are supported by clinical studies and explorations of cultural influences in this technical coverage. More than 100 species of edible fungi are documented.*

Widely available for \$18.95.

## Associations

The North American Mycological Association (NAMA) publishes a bi-monthly newsletter, *The Mycophile*, and publishes an annual directory that provides names and addresses of all NAMA members and every mycology association in North America. NAMA focuses more on finding and identifying wild mushrooms than commercial cultivation.

Annual membership is \$35. Contact:  
NAMA  
336 Lenox Ave.  
Oakland, CA 94610-4675  
[www.namyco.org/](http://www.namyco.org/)

The American Mushroom Institute is a source of information on the mushroom industry. It serves mainly large, highly capitalized commercial producers.

AMI Washington DC Office  
One Massachusetts Avenue, N.W.  
Suite 800  
Washington, D.C. 20001  
202-842-4344  
[ami@mwmlaw.com](mailto:ami@mwmlaw.com)  
[www.americanmushroom.org](http://www.americanmushroom.org)

AMI Avondale Office  
1284 Gap Newport Pike  
Suite 2  
Avondale, PA 19311  
610-268-7483  
[MushroomNews@kennett.net](mailto:MushroomNews@kennett.net)

## Web sites

[Note that addresses may change. A search of the Web should provide current locations.]

### How to Grow Mushrooms

[www.gov.ns.ca/nsaf/elibrary/archive/hort/organic/990015.htm](http://www.gov.ns.ca/nsaf/elibrary/archive/hort/organic/990015.htm)

*From the Nova Scotia Department of Agriculture and Fisheries, this Web page offers a good overview of growing mushrooms in compost.*

### The Mushroom Council: Six Steps to Mushroom Farming

[www.mushroomcouncil.org/production/six-steps.htm](http://www.mushroomcouncil.org/production/six-steps.htm)

*From the Pennsylvania State University Agriculture Extension Service, this page describes step by step phase I composting, phase II composting, spawning, casing, pinning, and cropping.*

### Permaculture with a Mycological Twist: The Stametsian Model for a Synergistic Mycosphere

[www.fungi.com/mycotech/permaculture.html](http://www.fungi.com/mycotech/permaculture.html)

*This article carried on the Fungi Perfecti Web site describes permaculture applications for mushrooms. (See the sidebar.)*

### Mush-World

[www.mushworld.com/home/](http://www.mushworld.com/home/)

*"Total mushroom information" is the banner claim here. This excellent resource features sections on cultivation, pests and disease, and medicinal mushrooms, as well as the monthly webzine Mushworld. Requires free registration for access. Highly recommended.*

### Penn State Mushroom Spawn Laboratory

[MushroomSpawn.cas.psu.edu/](http://MushroomSpawn.cas.psu.edu/)

*A comprehensive Web site with resources on mushroom science and cultivation.*

### Gourmet Mushrooms

[www.arrowweb.com/MUSHROOM/](http://www.arrowweb.com/MUSHROOM/)

*Source of mushroom kits and mushroom nutraceuticals; extensive bibliography on the medicinal value of mushrooms (<[www.gmushrooms.com/Healthref.html](http://www.gmushrooms.com/Healthref.html)>).*

### Fungal Jungal: Western Montana Mycological Society

[www.fungaljungal.org](http://www.fungaljungal.org)

*A good example of a regional mycological society Web site filled with diverse resources, including information on morels, fire ecology, a western mushroom photo guide, and recipe lists.*

The Mushroom Council  
[www.mushroomcouncil.org/](http://www.mushroomcouncil.org/)

*Home of the mushroom industry's marketing council, this site contains useful information about consumer buying trends and providing for food service needs, as well as nutritional and production information; focuses mainly on *Agaricus* spp. with no specialty mushroom differentiation.*

## Resources (shiitake)

### Bibliography: shiitake

Rafats, Jerry. 1996. Shiitake: Cultivated Mushroom. Quick Bibliography Series B:90-4. National Agricultural Library, Beltsville, MD.

*A bibliography of articles on shiitake mushrooms. Though somewhat dated (published in 1996), this collection still contains valuable information for shiitake producers. It's available on-line at <[www.nal.usda.gov/afsic/AF-SIC\\_pubs/qb9613.htm](http://www.nal.usda.gov/afsic/AF-SIC_pubs/qb9613.htm)>.*

### Books: shiitake

Harris, Bob. 1994. Growing Shiitake Commercially. 2nd Ed. Science Tech Publishers, Madison, WI. 72 p.

*Large-scale cultivation of shiitake mushrooms using traditional oak logs. Based on many years' work, including material from recent visits to Japan. Some of the most modern and cost-effective methods are presented with photographs and drawings.*

Available from Mushroompeople (See **Suppliers**).

Kozak, M.E., and J. Krawczyk. 1993. Growing Shiitake Mushrooms in a Continental Climate. 2nd Ed. Field & Forest Products, Peshtigo, WI. 114 p.

*Describes step-by-step year-round shiitake cultivation, from log inoculation to fruiting.*

*Excellent reference for inland producers*

Available for \$17.50 postage paid from Field & Forest Products, Inc.  
(See Suppliers.)

Przybylowicz, Paul, and John Donoghue. 1990. Shiitake Growers Handbook. Kendall/Hunt Publishing Co., Dubuque, IA. 217 p.

*Book covers a wide range of topics, from log cultivation to sawdust cultivation. Information includes both scientific material and practical advice. Emphasis is on presenting as much information as possible rather than selectively choosing the best or most advanced methods.*

Widely available for \$25.

Jones, Kenneth. 1995. Shiitake: The Healing Mushroom. Healing Arts Press, Rochester, VT. 128 p.

[www.parkstpress.com/titles/shiita.htm](http://www.parkstpress.com/titles/shiita.htm)

*This book describes the nutritional benefits and traditional uses in Chinese medicine for shiitake mushrooms. Chapters cover shiitakes used in folk medicine for controlling cholesterol, cancer prevention, treating viruses and chronic fatigue syndrome.*

Widely available for \$9.95.

### Web sites: shiitake

The Ohio State University Extension Office features a series of on-line fact sheets that detail shiitake cultivation.

- Shiitake Mushroom Production: Introduction and Sources of Information and Supplies  
<http://ohioline.osu.edu/for-fact/0039.html>
- Shiitake Mushroom Production: Obtaining Spawn, Obtaining and Preparing Logs, and Inoculation  
<http://ohioline.osu.edu/for-fact/0040.html>
- Shiitake Mushroom Production: Logs and Laying Yards  
<http://ohioline.osu.edu/for-fact/0041.html>
- Shiitake Mushroom Production: Fruiting, Harvesting and Crop Storage  
<http://ohioline.osu.edu/for-fact/0042.html>



- Shiitake Mushroom Production: Economic Considerations  
<http://ohioline.osu.edu/for-fact/0043.html>

#### Growing Shiitake Mushrooms

<http://osueextra.com/pdfs/F-5029web.pdf>

*From the Oklahoma Cooperative Extension Service, this factsheet offers an overview of shiitake cultivation suitable to hardwood forests of east and central Oklahoma.*

## Spawn and Equipment Suppliers

[This list is not comprehensive and does not imply endorsement of these companies.]

Amycel Spawn  
P.O. Box 560  
Avondale, PA 19311  
800-795-1657 or 800-995-4269 (toll-free)  
[www.amycel.com](http://www.amycel.com)

Choice Edibles  
584 Riverside Park Road  
Carlotta, CA 95528  
707-768-3135  
[www.choiceedibles.com](http://www.choiceedibles.com)

CropKing  
5050 Greenwich Road  
Seville, OH 44273-9413  
330-769-2002  
330-769-2616 FAX  
[www.cropking.com/mushroom.shtml](http://www.cropking.com/mushroom.shtml)

Field & Forest Products  
N3296 Kozuzek Rd.  
Peshtigo, WI 54157  
800-792-6220 (toll-free)  
[www.fieldforest.net](http://www.fieldforest.net)

Fungi Perfecti  
P.O. Box 7634  
Olympia, WA 98507  
260-426-9292  
[www.fungi.com](http://www.fungi.com)

Garden City Fungi  
P.O. Box 1591  
Missoula, MT 59806  
406-626-5757  
[www.gardencityfungi.com](http://www.gardencityfungi.com)

Gourmet Mushroom Products  
P. O. Box 515 IP  
Graton, CA 95444  
707-829-7301  
707-823-9091 FAX  
[www.gmushrooms.com/pots/](http://www.gmushrooms.com/pots/)

Hardscrabble Enterprises, Inc.  
P.O. Box 1124 (or 617 N. Main St.)  
Franklin, WV 26807  
304-358-2921  
[hardscrabble@mountain.net](mailto:hardscrabble@mountain.net)  
Contact: Paul Goland

L.F. Lambert Spawn Co.  
1507 Valley Rd.  
Coatesville, PA 19320  
610-384-5031

Long Ridge Farms  
406 Tom Cook Rd.  
Sugar Grove, NC 28679  
828-297-4373

Mushroompeople  
P.O. Box 220  
560 Farm Rd.  
Summertown, TN 38483  
931-964-2200  
[www.thefarm.org/mushroom/mpframe.html](http://www.thefarm.org/mushroom/mpframe.html)

Myco Supply  
P.O. Box 16194  
Pittsburgh, PA 16237  
800-888 0811 (toll-free)  
[www.MycoSupply.com/](http://www.MycoSupply.com/)

Northwest Mycological Consultants  
702 NW 4th St.  
Corvallis, OR 97330  
541-753-8198  
[NMC@nwmycol.com](mailto:NMC@nwmycol.com)

Sylvan Spawn Laboratory  
West Hills Industrial Park

Kittanning, PA 16201  
800-323-4857 (toll-free) or 724-543-2242

J.B. Swayne Spawn Co.  
P.O. Box 618  
Kennett Square, PA 19348  
610-444-0888

UNICORN Imp. & Mfg. Corp.  
113 Highway 24  
Commerce, Texas 75429 USA  
800-888-0811 (toll-free)  
UNICORNbag@aol.com  
www.unicornbags.com

Western Biologicals, LTD.  
P.O. Box 283  
Aldergrove, BC V4W2T8  
CANADA  
604-856-3339  
westernb@shaw.ca

By Alice Beetz and Michael Kustudia  
NCAT Agriculture Specialists  
July 2004  
© NCAT 2004  
IP 087  
Slot 75  
Version 042705

# Timber Management

Cooperators:  
Delta Wildlife, Inc.

Forest and Wildlife Research Center,  
Mississippi State University

Mississippi Department of Wildlife,  
Fisheries and Parks

Mississippi Fish and Wildlife Foundation

Mississippi Forestry Commission

USDA, Natural Resources Conservation  
Service

USDA, Farm Service Agency

# Pine Forestland Habitat Management for Wildlife



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# Introduction

With forethought and planning, forest landowners can increase wildlife populations in their forests. But creation and maintenance of high quality habitat requires active management. There are a number of management practices that forest owners can use to increase and improve forestland wildlife habitat. Habitat management practices, such as thinning, that benefit quail, deer, turkey,

and songbirds can also improve timber stand quality. Forest management is absolutely essential for maintaining populations of wildlife species like quail and rabbits that depend on early successional habitats. These species are not highly mobile, and forest-dominated properties that lack grassy habitats will not support species that require a diversity of native grasses and forbs.



## **Closed-canopy pine plantation**

Notice the absence of grasses and forbs in the understory to provide food or cover resources for quail and other grassland wildlife. These stands are also devoid of high quality foods for other wildlife like deer or turkey.

# Established Stands

Reducing tree density is the first step in developing the grass and forb ground cover so valuable to quail and other grassland species. Thinning reduces stem density and opens the forest canopy, allowing more sunlight to reach the ground and stimulating growth of ground-layer vegetation. In Mississippi, most species of pines can be commercially thinned for the first time at 13-18 years of age, depending on the site. Typical timber thins reduce basal area to about 70 ft<sup>2</sup>/acre, but thinning stands to a basal

area of 60 ft<sup>2</sup>/acre or less produces better grassland wildlife habitat. If grassland wildlife habitat is a greater priority than timber production, a basal area as low as 30 ft<sup>2</sup>/acre will produce optimal habitat. In most cases, periodic thins will be necessary to maintain lower basal areas as trees continue to grow after each thin. Individual landowner objectives will vary, so consultation with a registered forester and a wildlife biologist can help you find the best balance that meets both your wildlife and timber objectives.



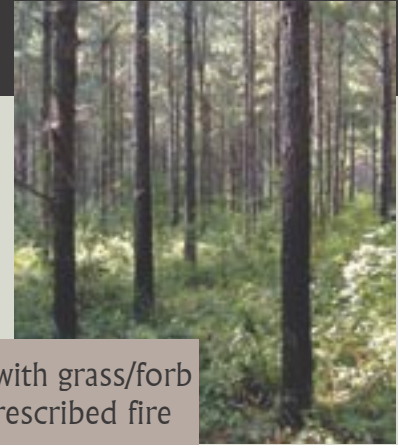
Pine plantation thinned along every fifth row. Notice the increased sunlight that is visible along the thinned row.

# Established Stands

Just as thinning stimulates growth of grasses and forbs, it also releases understory hardwood brush and trees that will shade out desirable grasses and forbs if left unmanaged. Some form of periodic disturbance will be necessary to control brush invasion. Prescribed fire and disking are two disturbance tools. When fuel conditions are appropriate for burning, thinned pine stands should be prescribe-burned during winter to early-spring. Prescribed burning should always be conducted by a certified prescribed burn manager, who will develop a written burn plan and obtain appropriate permits before burning. Check with your county Mississippi Forestry Commission office for more information about prescribed burning regulations. If prescribed fire is not an option, light disking between thinned trees during fall or winter is an alternative for relatively clean sites. Always be especially cautious when disking in woodlands to avoid damaging tree trunks and roots and to avoid personal injury or equipment damage. Soil disturbance, such as prescribed fire or disking, enhances habitat quality for quail and other grassland birds because it inhibits woody brush growth, promotes favored seed producing plants, reduces plant residue, increases bare ground, and increases insect abundance. The plant communities that develop following fire or disking also provide highly nutritious forage for deer, rabbits, and turkeys.



Prescribed fire in pine



Thinned pine stand with grass/forb understory after prescribed fire

In the absence of soil disturbance, the plant community composition changes over several years, and annual plants are replaced by perennial forbs and grasses and eventually, woody plants. This change in plant communities is called succession. By planning soil disturbances on a 2- to 3-year rotation, you can manage succession and develop a complex of different habitats that meet the seasonal habitat requirements of a number of wildlife species. For example, first-year burn areas typically produce good quail brood cover, whereas second- and third-year burn areas provide better nesting cover. A rotational burning plan can be developed by creating 60-acre or smaller burn units and burning half to a third of these units one year, another half to a third the next year, and so on. Thus, a given unit is only burned every 2-3 years, but some portion of the property is burned each year. A rotational disking plan can be developed similarly. Disk a half to a third of suitable area each year in a rotational fashion so that all suitable areas are disked every 2-3 years.

# Established Stands



Pine stand invaded by hardwood brush (left) compared to a pine stand treated with selective herbicide (right). Notice the grass/forb understory present in the herbicide treated stand.

Often, fire has been excluded from pine stands for so long that invasive hardwood species can no longer be controlled by low-intensity prescribed fires or disking. After thinning, if hardwood sprouts are abundant in the understory or midstory, it may be necessary to treat these stands with a selective herbicide such as imazapyr (e.g. Chopper®). Chemical control of invasive hardwoods is enhanced when prescribed fire is used during the dormant season following herbicide application (wait at least 6 months after application before burning to maximize herbicide effectiveness). Once these hardwood species are controlled with herbicide, future fire or disking treatments on a 2- to 3-year rotation should provide better control of hardwood invasions.

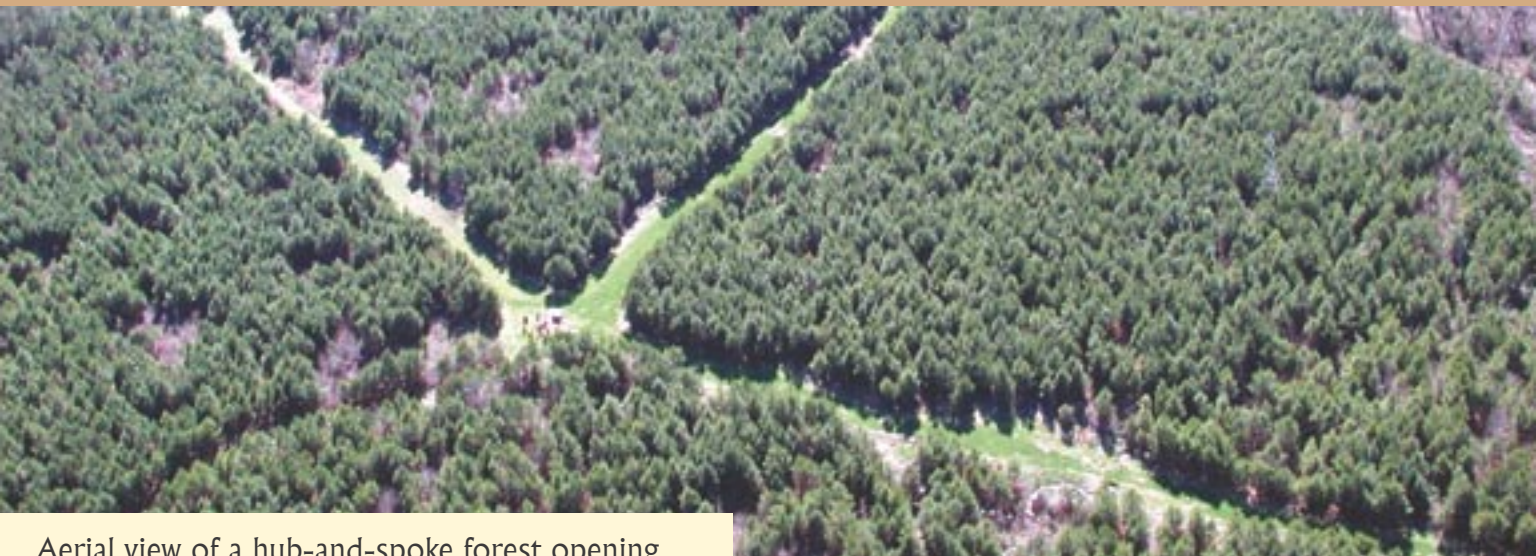
With some planning, you can protect some mast/fruit producing hardwoods and shrubs from prescribed fire and herbicide treatments. These scattered hard and soft mast producing trees and shrubs can provide food and cover resources for a diversity of wildlife. Invasive, exotic vegetation (e.g. kudzu, cogongrass) should also be controlled by herbicide treatment. Cogongrass, especially, is extremely invasive and seriously detrimental to native plants and wildlife habitat. Herbicidal control of all types of invasive vegetation will be more economical and effective if invasive species are treated when they first appear. Contact a forester or wildlife biologist to develop a plan for controlling invasive vegetation.



# Established Stands

A good way to produce more grassland wildlife habitat in forestland is to create forest openings. For quail, 10% or more of forested acreage should be maintained in openings. These can be created in established woodlands by clear cutting 1- to 5-acre patches throughout forest stands. Openings can easily be created during commercial thinning of pine stands. Plan ahead and have your forester mark out forest openings when marking timber for thinning. For mid-rotation pine plantations, a better approach to developing openings is to create interconnected forest openings in a hub-and-spoke design. The hub-and-spoke opening consists of a central opening (hub) from which open lanes (spokes) radiate through the pine stand as if simulating a wagon wheel. Hub-and-spoke openings can be created by removing several adjacent rows of trees

during thinning of a pine plantation. Hub-and-spoke lanes should be at least 30 feet wide to maintain grassy cover, and the maximum width of lanes will depend on how much timber acreage you are willing to remove from production (generally, the wider the lanes, the better). Hub-and-spokes can also be used as fire breaks for prescribed burning of mid-rotation pine stands. Forest openings can also be developed by widening or heavily thinning woodland roadsides and maintaining log-decks or skid trails used during timber harvests. Forest openings may also be used for permanent or rotational food plots planted to appropriate supplemental food crops and log-decks during timber harvests. Prescribed fire or disking on a 2- to 3-year rotation (described above) should be used to manage forest openings.



Aerial view of a hub-and-spoke forest opening.

# Regeneration

Clearcuts, and the subsequent plant communities that colonize a clearcut, typically provide good grassland wildlife habitat for 3-5 years after harvest.

Replanting will typically be preceded by some form of site preparation. Use of prescribed fire and mechanical site preparation methods will stimulate a suite of annual weeds, legumes, and grasses that will benefit quail and other early successional wildlife species.

Increasingly, herbicides are an important component of site preparation. Selective hardwood herbicides, like imazapyr, can increase pine growth and survival and inhibit development of a dense brush layer, thereby increasing the window of grass/forb plant communities early in the rotation. Use of herbicides for herbaceous control after planting should be restricted to banded applications along the tree rows. When regenerating a harvested stand with planted pine loblolly, slash, or longleaf pine seedlings, replant trees on an 8- by 10-foot spacing if quail and other grassland wildlife is your objective. Planting trees on a wider spacing allows maintenance of grassland habitat for a greater period of time before canopy closure of plantations. Rotational disking between planted rows in relatively clean sites can be utilized during the first few years after planting to maintain grassland habitat structure. Always be especially cautious when disking in



Clearcut and early successional habitat.

regeneration sites to avoid damaging trees and to avoid personal injury or equipment damage. Where appropriate for the site, longleaf pine is much more conducive to grassland wildlife habitat management than other pines because longleaf can be burned at a younger age. Also, limb and leaf characteristics of longleaf pines generally allow more sunlight to reach the ground, thereby creating a more favorable environment for grasses and forbs. Longleaf pine seedlings can be prescribed-burned the year after establishment, but do not burn once seedlings begin height growth. After trees are greater than 6 feet in height, prescribed burning may be resumed (in well managed longleaf stands, these heights have been documented by the end of the third or fourth growing season). Consultation with a registered forester is recommended before burning young longleaf pine stands. As with other pine species, rotational disking between planted rows may be utilized to maintain grassland habitat structure when prescribed fire is not feasible.

# Regeneration

Longleaf (left) and loblolly (right) pines planted at the same time and same seedling density (about 600 trees per acre). Notice how much more open the longleaf pine canopy is than the loblolly pine canopy.



As in established stands, a good way to produce grassland wildlife habitat in regenerated forest stands is to create forest openings. You can create forest openings by simply leaving some well distributed 1- to 5-acre unplanted patches of land when regenerating with planted seedlings. A better approach to developing openings in pine plantations is to create interconnected openings in a hub-and-spoke design. With the hub and spoke design, grassland habitat

corridors can be maintained throughout the stand after the forest canopy closes. Without interconnecting forest openings, grassy openings within young pine plantations will become isolated and generally unusable for quail as the pine canopy closes. Hub-and-spoke openings can also serve as fire breaks to protect young plantations from wild fire and for prescribed burning in later years. These openings are also useful for log-decks during future timber harvests.

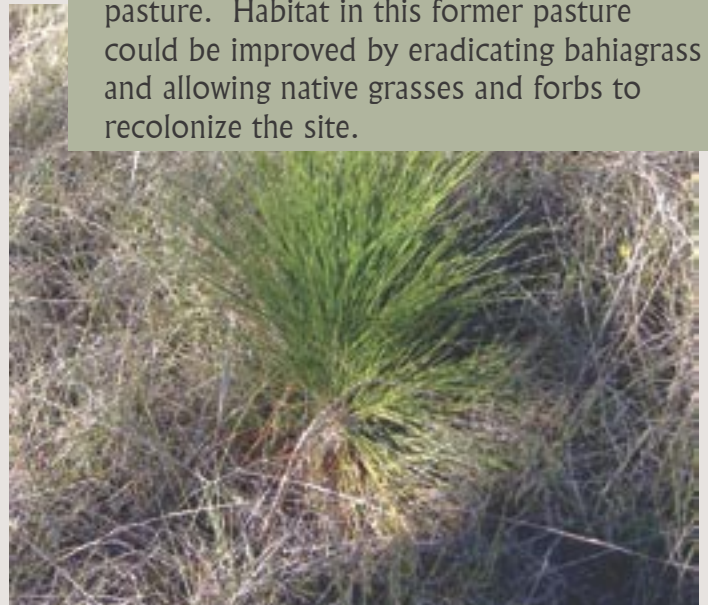
# Agricultural Sites

Converting former agricultural fields or pastures to pine forestland and managing for grassland wildlife habitat is accomplished in the same general way as regeneration of recently harvested forests. However, pine plantings at these sites should be preceded by site preparation to control herbaceous competition. This is especially true when sod-forming, exotic grasses are present at the planting site. The most common of these invasive, exotic grasses include fescue, bahiagrass, bermudagrass, and johnsongrass (cogongrass is less common but extremely invasive and seriously detrimental to native plants and wildlife habitat). These exotic grasses provide poor wildlife habitat and compete with growing seedling trees. Longleaf pine seedlings are especially sensitive to competition

with invasive, exotic grasses. Eradication of these grasses will significantly improve longleaf seedling survival. Exotic grasses should be eradicated with an appropriate herbicide treatment, but the appropriate treatment differs depending on which exotic grass or grasses are present. Consult with your forester to develop an appropriate herbicide prescription for pine establishment in former agricultural fields. Once invasive grasses are controlled, these sites can be managed as recommended for forest regeneration sites. Wildlife habitat in these old field pine plantings may be further enhanced by planting native grasses and forbs between seedling rows after exotic grasses have been eliminated.



Old field pines



Longleaf pine seedling in an old bahiagrass pasture. Habitat in this former pasture could be improved by eradicating bahiagrass and allowing native grasses and forbs to recolonize the site.

# Landowner Assistance

Developing an integrated forest-wildlife management plan with a wildlife biologist and a registered forester can provide valuable assistance in the implementation of these practices for both wildlife habitat and timber management. A number of cost-share programs exist that can help with implementation costs associated with forest management practices. In order to successfully achieve management goals, clearly established objectives (forest-wildlife management plan) should be in place before consulting with agencies that administer cost-share programs. By planning ahead, programs and practices that accomplish management objectives and are financially sound may be selected.

Following is a brief summary of a few financial assistance programs available for private landowners.

The Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), and Conservation Securities Program (CSP) are available for landowners with eligible production agriculture land. CRP provides conservation practices for field-level management, whereas EQIP and CSP are more oriented toward whole-farm management. While many of the same goals can be accomplished with each program, there are differences in eligibility and financial incentives under each



# Landowner Assistance



program. If acreage is enrolled in an existing CRP pine woodland conservation cover, mid-contract management cost-shares are available for prescribed fire, herbicide application, and disking. Contact the county Farm Service Agency office for more information regarding CRP. If a whole-farm management program is applicable to the property, contact the county Natural Resources Conservation Service (NRCS) office for more information on EQIP or CSP. Forest management practices available through EQIP will depend on the county in which the property is located. Depending on land uses, multiple farm programs may be applied to optimize conservation and financial benefits.

The Wildlife Habitat Incentives Program (WHIP), Forest Land Enhancement Program (FLEP), and Forest Resource Development Program (FRDP) are available to any non-industrial private forestland owners. Contact the county NRCS office about WHIP or the county Mississippi Forestry Commission office for more information about FLEP and FRDP. These three programs provide cost-shares for forest management practices such as prescribed fire, herbicide application, and disking. The Mississippi Fish and Wildlife Foundation (MFWF) has a longleaf pine restoration program available. Contact MFWF for more information about their longleaf restoration program.

# Landowner Assistance

The following agencies are available to provide wildlife and forest management planning or technical assistance:

## Mississippi Department of Wildlife, Fisheries and Parks

[www.mdwfp.com](http://www.mdwfp.com)

Dave Godwin, 662.325.5119

State Office, 601.432.2400

## Mississippi State University

[www.cfr.msstate.edu](http://www.cfr.msstate.edu)

Wes Burger, 662.325.8782

Rick Hamrick, 662.325.5470

## Mississippi State University Extension Office

[msucares.com](http://msucares.com)

[www.naturalresources.msstate.edu](http://www.naturalresources.msstate.edu)

662.325.3176

## Delta Wildlife, Inc.

[www.deltawildlife.org](http://www.deltawildlife.org)

Trey Cooke, 662.686.3372

## Mississippi Fish and Wildlife Foundation

[www.wildlifemiss.org](http://www.wildlifemiss.org)

Daniel Coggin, 662.256.4486 (Northeast Miss.)

Randy Browning, 601.296.1173 (South Miss.)

## Mississippi Forestry Commission

[www.mfc.state.ms.us](http://www.mfc.state.ms.us)

601.359.1386

## Natural Resources Conservation Service

[www.ms.nrcs.usda.gov](http://www.ms.nrcs.usda.gov)

Area 1 (Northeast Mississippi)

Biologist: John DeFazio, 662.534.7651

Forester: Lynn Ellison, 662.844.2341

Area 2 (Central Mississippi)

Biologist: Jeffrey Lee, 601.965.4559

Forester: Ramsey Russell, 601.965.4559

Area 3 (South Mississippi)

Biologist: Barry Pessoney, 601.296.1173

Area 4 (Delta)

Biologist: Kevin Nelms, 662.453.7841

State Office

Biologist: Glynda Clardy, 601.965.4339

Forester: Alan Holditch, 601.965.4339

Photographs courtesy

of:

Randy Browning

Wes Burger

Jim Cox

Scott Edwards

Andy Ezell

Rick Hamrick

Bobby Watkins

Shane Wellendorf

# Attract More Wildlife

## THROUGH TIMBER MANAGEMENT

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The 18.5 million acres of forestland in Mississippi are valuable lands that produce many renewable natural resource benefits, including timber, recreation, watershed, erosion protection, and wildlife.

Unfortunately, too many landowners are unaware of the many values their forestlands can provide them. For example, many people believe that unmanaged "natural" forests are best for game. Consequently, the average acre of Mississippi forestland produces less than its timber potential. Properly managed forests not only yield greater amounts of wood products, but they can provide high-quality habitat for many of the state's most valuable wildlife species.

Always consider timber management and wildlife management together. In fact, many landowners today receive additional income from recreational leases as a result of their more diverse timber and wildlife management programs.

Timber companies have leased lands for hunting and related recreational access for many years, but only recently have private landowners begun to make money on the wildlife values their forestlands can produce. Managing forestlands for wildlife can be financially rewarding and personally satisfying.

### Where To Start?

A common reason for unmanaged forestland is the landowner's idea that it is too costly to begin a forest management program. The essential first steps are planning and making decisions to keep costs low.

Professional help is as near as your telephone and is often free. Many agencies, such as the Mississippi Forestry Commission, stand ready to help you identify your management goals and to help you plan activities to reach those goals. Timber companies and private consultants also offer these services. In this phase, you will write a management plan that states your goals for the property and a schedule of management practices you will need to help you meet them.

Once you recognize the need to put the plan into action, the practices you use can be whatever you desire or can afford. For example, if turkeys are a management objective, you will need to provide forest openings for nesting and brood-rearing habitat. You can do this by harvesting small areas, making fire lanes and access roads, or improving and maintaining existing forest openings. See the end of this publication for a list of professional contacts.

### Wildlife Needs

Many of Mississippi's wildlife species depend on the forest to live. Some, such as deer, turkeys, and squirrels, spend most of their lives in the forest. All wildlife have four basic needs: food, water, space, and cover. Generally speaking, wildlife will prosper in an area with many habitat types. A diverse forest habitat combines different timber types, age classes, and stand conditions in one area.

Some forest habitats already provide the diversity; but if your forestland does not, you can supply it in many ways, often with only minor efforts. Even-aged timber



management can provide diversity by locating different age stands of pine close to one another. For example, research has shown that properly managed clear-cut areas close to young and mature pine timber stands provide excellent quail habitat for a few years.

However, when developing a wildlife management program, it is important to look closely at nearby properties and consider how they will influence your wildlife program. This is a key element of forest stewardship and is especially true when managing small ownerships. For example, in a turkey management program it would be pointless to create openings in a small forest that is next to an existing excellent opening, such as an unimproved pasture.

## Management Techniques

For many years foresters and wildlife managers have noted the value of forest openings for wildlife. Timber harvesting creates openings that may be large, as with clear-cutting, or small, as with selective harvests. Other disturbances, such as prescribed burning, can greatly improve wildlife habitat for many species and benefit timber production. By combining forest management practices in a management plan, you can aid wildlife while producing and improving valuable timber crops.

## Cutting Methods for Regeneration

Forest regeneration cutting is the removal of all trees from an area to allow a new forest to grow. In clear-cutting, all trees are harvested at the same time, whereas in seed tree and shelterwood harvests, many high-quality trees are kept until the forest reestablishes naturally. These cutting techniques are used to harvest marketable crops of timber and to create the best environment for young trees to grow. Following a regeneration harvest, many sun-loving plants begin to grow in the opening. Animals like to eat these tasty, nutritious plants, and many of the plants make large amounts of fruit and seed for wildlife food.

Many landowners are concerned with the negative impacts of regeneration harvests on wildlife. However, negative effects can be reduced if you will consider the size, shape, and distribution of harvested areas in the harvest plan. Small (20 to 100 acres), irregularly shaped regeneration cuts next to larger stands of different ages will provide a diverse habitat for many wildlife species. You can use these methods to regenerate pine and hardwood stands.

## Improvement Cuttings

During the natural development of a forest, young trees compete for all elements needed for growth. Some species or individual trees compete better than others and become dominant in the forest. The

dominant trees in an even-aged forest are large and fast growing.

The purpose of improvement cuttings is to remove small, slow-growing trees in favor of fast-growing, high-quality crop trees. Foresters use improvement cuttings to upgrade the quality of a forest by harvesting crooked, diseased, insect-damaged, and slow-growing trees. Such harvesting creates space for crop trees to grow and allows more sunlight to reach the forest floor. The light aids the growth of many low-growing plants valuable for wildlife.

These wildlife benefits do not last, however, because in a few years the remaining trees will close the forest canopy again and shade out many of the forage plants that were established after the harvest. Later improvement cuts can be made to help wildlife and increase the stand's timber value.

Remember, though, that some wildlife species need "den trees" for nesting and shelter. Therefore, when getting ready for improvement cuttings, it is wise to mark and keep several good den trees per acre. Den trees are food-producing species, such as oak, hickory, blackgum, beech, or persimmon. These will be useful to many wildlife species without a large decrease in timber production.

## Prescribed Burning

Controlled fire is a useful tool in pine timber management. Pine trees taller than 20 feet will tolerate low-intensity fires that will top-kill small hardwood stems. Foresters use prescribed burning to control hardwood competition in pine stands. When fire is combined with thinning (improvement cutting), it increases the wildlife habitat value of pine plantations.

Hardwood stems sprout from the roots after prescribed burning, increasing the food supply for wildlife. Thinning increases sunlight and allows other forage plants to become established. The result is an increase in available food for deer, turkey, rabbits, and quail.

This improved environment is temporary. In 3 or 4 years the sprouting hardwood stems will be too tall to be valuable for food, and most forage plants will be shaded out as the forest canopy closes again. Repeat prescribed burning and thinning in pine stands from time to time to benefit deer, turkey, rabbit, and quail populations.

Prescribed burning is a valuable technique for wildlife and forest management, but you must use it properly and at the right time. Contact a forester and plan a prescribed burning program to meet your specific land management goals. Remember, fire can destroy a forest if used carelessly. Wisely used, however, prescribed burning is an effective, low-cost management tool that benefits both timber and wildlife resources.

## Forest Herbicides

In recent years, forest herbicides have become a valuable forest management tool. Today's forest herbicides are safe and economical to use in a forest management program. They are used in site preparation, stand improvement, vegetation control, and wildlife habitat improvement. Herbicides often are used in southern pine timber management.

Compounds have been developed that can be applied over the top of southern pines to control unwanted vegetation without hurting the pines. This has given new management possibilities. Forest herbicides also can help in managing hardwood stands.

## Firebreaks and Access Roads

The foundation of a good forest management plan is a complete network of firebreaks and access roads. Foresters recommend these to landowners for forest protection, but because fire lanes and roads are openings, they also are important areas for wildlife.

Turkey, quail, and other wildlife will use fire lanes and roads for feeding, nesting, and brood-rearing, while deer will be attracted to them for food. Establishment of favorite wildlife foods, such as orchard grass and clover or other perennials, in fire lanes and along roadsides will improve wildlife benefits in these areas. Entry to roads and fire lanes, however, must be controlled with gates or chains so wildlife can use them safely.

## An Example

Mr. Anderson works for a manufacturing company in a small city and in the next county has 85 acres of forestland he inherited from his grandfather. He wants to make some income from the timber but doesn't want to sell any trees for fear of ruining his hunting opportunities. Turkey and white-tailed deer are his preferred species, but hunting gray squirrels is important, too.

His land has a 20-acre stand of young hardwood sawtimber along a stream on the east boundary and 45 acres of 25-year-old oak-pine timber. The remaining 20 acres are a 15-year-old pine plantation that has never been managed.

Mr. Anderson consulted a forester and developed a management plan to establish a few roads and firebreaks to provide access and fire protection for his property. These will also serve as wildlife openings, valuable for turkey brood-rearing areas, and as a food source for deer and rabbits.

An improvement cut in the hardwood stand that favors oak will help acorn production, and the oak crop trees will increase in size and value. He will take care to mark and leave several den trees per acre for gray squirrels.

He plans to thin the pine plantation for pulpwood to remove the poorest trees so more valuable trees will have space for further development. When the thinning is finished, he will use prescribed burning every third year to maintain the deer food supply and to provide areas for turkey nesting and brood rearing. He will do prescribed burning in late winter (February or March) to avoid turkey-nesting season. He also plans to thin his plantation again as soon as is practical, probably 6 to 8 years after the first thinning.

Mr. Anderson decided to manage the oak-pine for pine timber production, since his hardwood bottom-land is a good source of mast for wildlife. However, on 1 acre near the pine plantation, he decided to keep some large oak and hickory trees as another food source.

The remaining oak-pine stand needed an improvement cut to remove the large hardwood trees and the inferior pines. After the harvest, he will use prescribed burning on this stand at the same time as the pine plantation, except for the wildlife food area previously marked.

As a result of this management plan, Mr. Anderson will receive extra income from his forestland and can expect more profits from future harvests. The forest he has created will increase in value each year, while providing high-quality habitat for deer, turkey, rabbits, and squirrels.

Forest management improves the forest environment for people, animals, and trees. Your forestland is valuable for the wildlife, timber, and other products and benefits produced there. Forest management will add to your pleasure and satisfaction from forest ownership as it increases your income.

## Glossary

**Age class** - A group of trees about the same age, such as a 20-year or 7-year age class.

**Clear-cutting** - A harvesting and regeneration method that removes all the trees (regardless of size) on an area. Clear-cutting is often used with sun-loving species, such as pine. Clear-cutting produces an even-aged forest.

**Crop tree** - A tree identified to be grown to maturity and for final harvest. It is usually selected based on its location relative to other trees, quality, and species.

**Den tree** - Usually a mature tree used by wildlife as a home. Den trees are used by animals that need cavities to reproduce, such as woodpeckers, raccoons, and squirrels.

**Even-aged timber** - A forest of trees about the same age (usually within 10 years). An even-aged forest may be a natural or an artificially regenerated stand.

**Firebreak (fire lane)** - A natural or man-made corridor used to prevent the spread of fire. Firebreaks are created by the removal of trees, brush, and other vegetation.

**Forest canopy** - The layer of tree crowns in a forest.

**Habitat** - The natural environment of a specific plant or animal. An area containing all the necessary resources for the plant or animal to live, grow, and reproduce.

**Management Plan** - A written plan identifying short- and long-term management goals for timber and wildlife maintenance on a certain property.

**Mast** - The fruit of forest trees and plants (e.g., acorns, hickory and beech nuts, persimmons, and berries).

**Plantation** - An artificially forested area established by planting or direct seeding. It is usually made up of a single species.

**Prescribed burning program** - The consistent, periodic use of prescribed burning to achieve a management goal. A prescribed burning program may require burning every 3 years.

**Pulpwood** - Wood cut primarily to be converted into wood pulp to make paper or other wood-fiber products.

**Renewable natural resources** - Resources that can be restored over time through regeneration and improved management. Examples include forests, wildlife, water, and soil.

**Sawtimber** - Trees large enough to be sawed into lumber.

**Seed tree harvest** - Removing all trees from an area, except for 5 to 10 carefully selected seed trees. The seed trees are left to provide seeds to establish a new forest and are then harvested at a later time.

**Selective harvest** - Harvesting individually marked trees or small groups of trees based on their physical conditions or degree of maturity.

**Shelterwood harvest** - Removing trees on the harvest area by a series of two or more cuttings, so new seedlings can grow in the protection of older trees.

**Stand** - A group of trees with similar characteristics, such as a pine or hardwood stand or a sawtimber-size stand.

**Thinning** - Cutting in an immature stand to reduce the number of trees per acre. The remaining trees will grow faster and produce higher quality wood.

**Timber type** - A description of the main tree species in the forest, such as the oak-pine type or the slash-longleaf pine type.

## Contacts

- **Mississippi Forestry Commission** - See telephone listing for county forester.
- **Mississippi Department of Wildlife, Fisheries & Parks** - P.O. Box 451, Jackson, MS 39205.
- **Mississippi State University Extension Service** - Contact your county Extension agent.
- **Natural Resources Conservation Service** - Contact local district conservationist.
- **Private Consultants** - Listings are available through the Mississippi Forestry Commission or Mississippi State University Extension Service.
- **Board of Registration for Foresters** - Roster available, Box 9681, Mississippi State, MS 39762.
- **Forest Industry Landowner Assistance Programs** - Contact nearest office of desired firm.



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# Prescribed Burning in Southern Pine Forests:

## Fire Ecology, Techniques, and Uses for Wildlife Management

Prescribed burning is an important wildlife management tool used in our southern pine forests. Because these forests regularly experienced burns in the past, vegetation and wildlife have adapted to occasional fire and actually benefit from the effects of prescribed burning. Unfortunately, because of new pine management techniques and concerns about fire, many landowners are reluctant to use fire on their property. If done correctly, though, prescribed fire can be an effective, safe, and affordable management tool.

### Benefits to Wildlife

If used properly, fire is one of the most beneficial and cost-effective wildlife habitat management tools available. For example, annual burning maintains early stages of plant succession that bobwhites require. Fire reduces leaves/needles (litter) on the forest floor and exposes soil so bobwhites can easily find seeds. It creates open foraging and travel areas for hens with young chicks, and it encourages plants that provide food (insects and seeds) and cover for bobwhite. Fire also acts as fertilizer by removing vegetation and litter, returning many nutrients to the soil.

For bobwhites, patchy burns are best. Some "ring-arounds" (circular areas plowed around and protected from burns) provide nesting and escape cover across burned areas. It is generally best to burn in late winter before the bobwhite nesting begins in April.

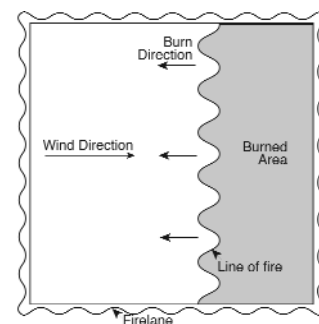
The wild turkey enjoys many of the same benefits from fire that bobwhites do. Burn before April to avoid nesting season, but burn less frequently (every two to four years). Fire produces nesting cover and maintains forest openings in quality brood-rearing habitat.

Burning every three to five years increases white-tailed deer forage production and quality. It also maintains forage close to the ground, well within a deer's reach. Burning top-kills hardwood brush and promotes sprouting of browse species. Winter burns are normally best for deer management.

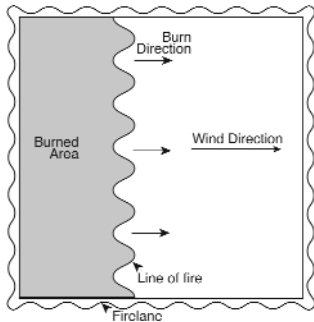
A partial list of species suffering from the declining use of fire includes the bobwhite, wild turkey, white-tailed deer, gopher tortoise, and red-cockaded woodpecker. Populations of other birds, mammals, reptiles, and amphibians also have declined in the absence of fire.

### Important Prescribed Burn Techniques

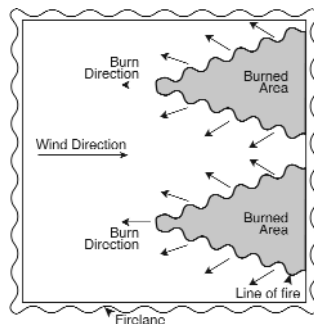
**Backfire** - A backfire is set at a 90-degree angle to the wind direction so the fire burns directly against the wind. This is one of the safest methods of prescribed burning and is recommended for beginning wildlife managers or where there are fire hazards, such as adjacent lands with high danger fuels. Wind speed should be no more than 6 to 10 mph. At night, backfires normally move about 1 chain (66 feet) per hour. If the wind speed is 20 miles/hour, the fire will back twice as fast (132 feet/hour).



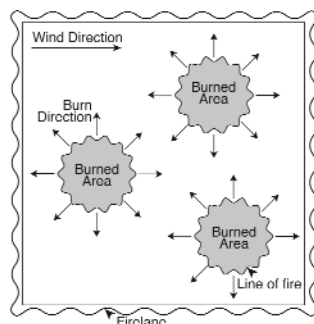
**Head fire** - Head fires are set with the wind direction and should only be used by experienced professionals under ideal fuel conditions. Often set after a rain, head fires are the most economical and the most dangerous type of prescribed fire. Head fires burn quickly, have a taller flame, and can kill even large pines if used improperly. If used properly, they are very effective at maintaining early successional wildlife habitat.



**Flank fire** - Flank fires are often used when the fuel is relatively light. These fires are set by an individual or individuals walking into the wind and are relatively safe.



**Spot fire** - Ideally, spot fires are set at equidistant locations throughout the forest. These fires gradually expand until they join.



## Expense and Equipment

Prescribed fire is one of the most economical wildlife management tools available. Burning costs vary with tract size, application method, manpower needed, equipment used, and timber/fuel conditions.

Never burn without either a bulldozer equipped with a fire plow, or a tractor and disk. Other required equipment includes drip torches, fuel (a 3:1 mix of diesel and gasoline), fire rakes, flappers, and water. Costs range from \$5 to \$25 per acre. Consulting foresters and the Mississippi Forestry Commission (MFC) will conduct burns for a fee.

## Burn Permits and Applicator Certification

Currently, the Mississippi Forestry Commission (MFC) requires you to get a permit before burning. Contact your county MFC office for permit information. If conditions to burn are not favorable, the burn permit will not be granted. Also, burn applicators should be certified by the MFC. You also can be certified by completing the prescribed burning short course conducted by Mississippi State University's Continuing Education program, located in the College of Forest Resources. Under the current Mississippi Prescribed Burning Law, all who satisfactorily complete the course will have reduced liability.

## Steps to Conducting a Prescribed Burn:

- Get burn applicator certification.
- Map and develop a plan for the area to be burned. Have the plan notarized at least 10 days before the burning date.
- Arrange for equipment and personnel.
- Build fire lanes around the tract within 1 month of the burn.
- Determine wind speed and direction, humidity, temperature, and firing technique.
- Notify neighbors of your plan.
- Recheck fire lanes, and recondition them if necessary.
- On the burn day, get a permit from the MFC.
- Conduct the burn.
- After the burn, check all boundaries for "break overs" (escaped fire).

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Revised by **Dr. Ben West**, Assistant Extension Professor, Wildlife & Fisheries

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# WOODLAND MANAGEMENT

John D. Hodges

## **Overview of Silvicultural Practices and Wildlife Habitat**

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Most woodlands, or forests, are composed of forest stands that may vary in size from a few acres to 100 acres or more but are sufficiently uniform in age, composition, and site to be recognized as a separate unit. When discussing wildlife management on forest or woodland areas, we often speak of the influence of forest management practices and these are important at a large-scale level, but it is imperative we understand that the real influence of forest practices is accomplished by modifications at the stand level; these modifications are collectively called “silvicultural” practices. They involve practices such as stand regeneration, thinning, improvement cuts, burning, and fertilization. Forest management on the other hand involves planning and scheduling for all the stands, which involves economic and biological considerations. It should also be realized that silvicultural practices are simply tools used to modify stands to meet the objectives of the owner and are just as valid for wildlife habitat improvement as for timber management. The basic requirements for wildlife are food, cover water, and space. In a forested environment, silvicultural practices are used to enhance or modify one or more of these requirements and therefore enhance the habitat for selected species.

When managing a forest for a variety of wildlife species, habitat diversity is the key. While silvicultural practices can and should be used to create or maintain diversity at the stand level, the emphasis for most owners should be on diversity at the forest level by manipulating individual stand conditions to create a mosaic of habitats across the landscape. Creating or maintaining variation in structure (height differences) of the vegetation is one of the

most important aspects of habitat management for a variety of wildlife species. Number of wildlife species and individuals tends to increase with structural diversity. Within-stand structure, even in plantations, can be obtained by practices such as leaving of snags and legacy trees, proper use of streamside management zones (SMZs), and use of wildlife habitat zones or corridors. Landscape diversity is assured by using natural features of the property to create or maintain stands in a mosaic across the property that differ in age, size, and species composition.

In discussions of the relationship between silvicultural practices and effects on wildlife habitat, one important point that is often overlooked is that a given practice does not always affect habitat, even for a given wildlife species, in the same way. Effects of the practice will vary depending on such variables as site, timing of application, location in relation to other stand treatments, arrangement or layout of the stand, and intensity of the operation (e.g. completeness of the clear cut or severity of a thinning). For example, small clear cuts or heavy thinnings in the interior of a large forest may be very desirable for wildlife species needing open or early successional types, and may have little or no effect on species requiring closed canopy or late successional forest types. On the other hand, these same type harvests applied at the edge of the forest may not benefit or even be harmful to some of the same wildlife species benefiting from the harvests in the forest interior. This could happen, for example, to some bird species because of nest predation in areas near the edge of the forest.

Perhaps the most important point to be made is that management of a forest for forest products and for wildlife habitat are very compatible and, in fact, are

inseparable. Furthermore, managing for wildlife habitat most often can be done at little or no reduction in returns for timber management. Silvicultural practices used for timber management are also effective for wildlife habitat management in that they may manipulate such things as landscape diversity, stand structure, plant succession and diversity, and edge effects. However, when managing for both, the choice, timing, and intensity of a silvicultural practice must be based on an understanding of the requirements of the targeted wildlife species as well as a knowledge of the effects on stand ecology and development.

The purpose of this chapter is to describe various silvicultural practices and stand conditions, their relationship to wildlife habitat, and how they can be used to maintain or create desirable wildlife habitat.

### **The Importance of Planning**

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As previously stated, silvicultural practices are the tools used for wildlife habitat management in forested landscapes. All silvicultural practices benefit some wildlife species but can be detrimental to others. Furthermore, silvicultural practices can be designed to benefit or improve the habitat for any wildlife species. To do this, one must understand the effects of silvicultural practices on the environment and when and how they should be used to accomplish the desired objective.

If a landowner wishes to manage a forest area for wildlife or for a combination of timber and wildlife, they must be prepared to do a considerable amount of planning and preparation. They must first: (1) establish their objectives as to the wildlife species they wish to favor, (2) know or establish the habitat requirements of those species as to cover, food, and water in local and landscape areas, (3) determine if these requirements are present or can be established on the property by silvicultural manipulations, and (4) determine if these habitat requirements are compatible with

requirements or goals for timber production. The best way to assure that this type of preparation and planning is done in a way to accomplish the desired objectives is to prepare a forestry/wildlife habitat management plan. Such a plan is nothing more than a process of using maps and a knowledge of the existing forests and property to develop a planning and scheduling process that is tied to the land, i.e., it will allow you to document the exact type habitat you want to create, where you want it created, and when it will be created. For small holdings, grid or topo maps may be adequate for the planning process, but a geographic information system (GIS) greatly improves the planning process on large holdings.

Even with the best planning and implementation, unexpected results can sometimes occur. For that reason, it is important that the management plan provide provisions for monitoring the results of practices used on the forest. Monitoring will provide landowners or managers with information on how successful they have been in their management practices and will indicate where modifications may be needed in the future. Landowners can obtain assistance in developing management plans from state agencies such as Fish and Game Departments, Forestry Commissions or Departments, and State Extension Services.

Management plans are usually developed for periods of 5-10 years and specify the timing, spatial location, and type of silvicultural operations to be used to maintain or create the desired habitats. The following sections give information on commonly used silvicultural techniques and how they can be used to improve wildlife habitat as well as timber production.

### **Common Silvicultural Practices**

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Mississippi has approximately 19 million acres of forest land of which 6 million is classified as pine type, 3 million acres as

oak/pine, and 10 million as hardwood type. Silvicultural practices normally used for hardwood stands are very different than those used for pine stands – the major difference being in the regeneration methods used. Most pine stands are now regenerated using artificial methods, i.e., planting of seedlings, while hardwoods are regenerated by natural means, i.e. seed or sprouts from trees on the site. The silvicultural practices discussed below may be appropriate for both pine and hardwood stands, but the way they are used and the effects on the resulting stands may be quite different.

### **Forest Type Conversion**

Of all forest practices, the one that has the most influence on biodiversity and therefore on wildlife habitat is conversion of natural pine stands, mixed pine-hardwood, and hardwood stands to pine plantations or agricultural crops. It is worth noting that Mississippi now has more acreage in pine plantations than in natural pine stands, and most of the conversion currently occurring is from natural pine or mixed pine-hardwood to pine plantations. Extensive conversion of bottomland hardwood stands to farm land occurred in the past, primarily in the Delta, but the trend is now reversed. As a result of Federal programs such as the Conservation Reserve Program (CRP) and Wildlife Reserve Program (WRP), the acreage in bottomland hardwoods is now increasing.

On a landscape basis, conversion of a limited amount of upland area to pine plantations may be beneficial to wildlife habitat, especially in the early stages of stand development. However, if widespread and done on large areas it will reduce both within stand and landscape diversity. This is especially true if accomplished by intensive site preparation as discussed below.

### **Clearcutting/Site Preparation/Planting**

Clearcutting with site preparation and planting of pine seedlings is the most common form of stand regeneration on upland sites. It is a form of artificial regeneration as opposed to natural regeneration that depends on seed or sprouts from an existing stand rather than nursery-grown seedlings. The thing that really makes it so different from other regeneration methods, in terms of effects on wildlife habitat, is the use of site preparation methods to modify the site and control vegetation that may compete with the planted seedlings.

A variety of methods are commonly used alone or in combination for site preparation. These methods include, in order of increasing intensity, burning, herbicides, chopping, disking, shearing and piling, and bedding. If the objective is to favor a variety of wildlife species, less intensive methods of site preparation such as burning are probably more favorable than more intensive methods such as piling and burning or bedding. The less intensive methods may kill much of the existing shrubs and ground cover, but they often just hold it in check by top kill, allowing plants of an earlier stage of succession to become establish and flourish at least for a time. The more intensive methods not only destroy more of the ground flora and understory species and their ability to regenerate but they also reduce structural diversity and hasten development of the pine stand and crown closure which further reduces the growth of subordinate vegetation. However, even the most intensive forms of site preparation may be beneficial, at least in the early stages of stand development, to some wildlife species such as white-tailed deer, quail, rabbits, and turkey that require open conditions and early successional stage plant species.



## **Clearcutting With Natural Regeneration**

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Southern hardwoods, both upland and bottomland, are commonly regenerated by clearcutting. The method is very successful in regenerating hardwood stands, but the problem is in controlling composition and obtaining the desired species in the next stand. For wildlife habitat and timber production it is usually desirable to obtain the hard mast species such as oaks. Successful oak regeneration usually depends on the presence of advance regeneration (seedlings) at the time of harvest, and the larger the seedlings the greater is the probability of success. If advance regeneration is not present, the harvest should be delayed until it can be obtained.

If a sufficient number of oak seed trees are present, light is most often the limiting factor to establishment of advance oak regeneration beneath a stand. With a good acorn crop, thousands of seedlings per acre may be produced but with insufficient light they will survive only one or two years. Light to the forest floor can be restricted in very dense stands by the main tree canopy, but in most stands light is restricted by thick midstory and understory canopies. Establishment of advance oak regeneration can often be obtained by control of the lower canopies, either by harvesting or injection with herbicide. However, this operation should be timed with a good acorn crop and can be done before or soon after the acorns have germinated.

Used properly, clearcutting can be an excellent tool for hardwood management and for improving wildlife habitat. Control of large woody material by cutting or injection may be necessary in some cases but site preparation usually is not needed. Herbaceous and woody plants are quickly re-established on the site, thus providing browse for white-tailed deer and food and cover for many other wildlife species. For regenerating most desirable hardwood species, the key to success of the

clearcutting method is a thorough evaluation to determine if the regeneration potential is adequate. This usually means presence of adequate advanced regeneration (seedlings/saplings) of the desirable species. If the advanced regeneration is not present in sufficient numbers, steps must be taken to secure it before the final harvest is made.

Clearcutting with natural regeneration is not often used for pine regeneration, although it can be very effective and was used extensively in the past. The method is used in several ways. One way is to clearcut small patches or strips, use controlled fire to reduce the logging residue and prepare a seedbed, and allow seeding from adjacent uncut stands. Another use of the clearcutting method is the "seed in place" technique where a prescribed fire is used to prepare a seedbed, pine seed are allowed to disperse from the trees to be cut, and the trees are then removed. A variation of the seed in place method is the "seedling in place" method where the seedbed is first prepared by burning, seed are dispersed from the trees and germinate to produce small seedlings, and the trees are then removed.

The major advantage of this type of regeneration over those using intensive site preparation is that the native herbaceous and woody vegetation is quickly re-established to produce food and cover for many wildlife species. Also, stands produced in this way are much more likely to be a mixture of pine and hardwoods. For timber production, the disadvantage may be that it will not produce the maximum product value.

## **Shelterwood/Seed Tree Regeneration**

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These are regeneration methods generally using natural regeneration in which the stand is removed in two or more harvest cuts. The two methods are similar except that far fewer trees are left in the seed tree method and it is always done in two harvest

cuts whereas the shelterwood method may be done in two or more cuts. The major advantage of these two methods as compared to clearcutting is that the establishment of regeneration can be assured before the final harvest that removes the seed trees.

The shelterwood method is very often the most dependable way to regenerate hardwood stands, especially if sufficient advance regeneration is not present to justify a clearcut. Normally, the first step in the shelterwood method is a seed tree cut, which is similar to a heavy thinning, to open up the stand for seedling establishment. If there is a midstory/understory of shade tolerant species that are undesirable, it will probably be necessary to cut or inject that material before or soon after the new seedlings germinate. Furthermore, the seed cut and midstory control should be timed with a good acorn or seedling crop. If the acorns or seedlings are not present at the time these operations are done the probability of success is greatly diminished. Once the new seedlings are well established, two-to-five years after the seed cut, the residual stand can be removed in one or more harvest cuts.

For heavy-seeded species such as the oaks, the seed tree method of regeneration is not appropriate in that seed distribution may not be sufficient to cover the area. For hardwoods with wind-blown seed the method may have some use but they can generally be regenerated just as well by clearcutting and there is no danger of losing the valuable seed trees to wind or lightning.

Southern pines can be regenerated by both the shelterwood and seed tree methods, but the shelterwood method is preferred for longleaf pine while the seed tree method is used most often for the other pine species. The first step in initiation of the seed tree method is a harvest that removes all except 3-to-10 trees per acre, depending on tree size and history of seed production and expected competition for the newly

germinated seedlings. The second step is some form of site preparation, usually burning although mechanical and chemical site preparation can be used, to control competition, reduce logging slash, and prepare a seedbed. If feasible, the seed trees can be removed 1-to-3 years after the new seedlings are established. The shelterwood method differs from the seed tree method in that more seed trees, often 20 or more, are left after the first harvest and the seed trees may be removed in more than one harvest after the seedlings are established.

With shelterwood/seed tree methods and natural regeneration, less emphasis is placed on intensive site preparation than with clearcutting and planting so there is a greater probability of maintaining native ground cover. With pines it is also likely that the new stand will contain a higher proportion of hardwood species. These differences may make the natural regeneration methods more attractive for some wildlife species. Also, regeneration costs may be far less with the natural methods, but production of commercially valuable material may be slightly reduced.

A variation of the shelterwood method, called irregular shelterwood or two-aged management, is gaining increased use across the south especially for hardwoods. After regeneration is established, a few of the more vigorous shelterwood trees, possibly 10-20 per acre are selected for retention and the remainder are harvested. These retained trees can be harvested at the first entry into the new stand or can be allowed to grow for the full rotation. A similar technique can also be used with clearcutting when adequate advanced regeneration is present. In this case vigorous trees of a desirable species, usually in the smaller age/size class, are picked for retention and all other trees are harvested. This technique can be very beneficial for many wildlife species in that structure is retained in the stand throughout the rotation and if most producing trees are left seed

production will occur much sooner. The technique is also financially attractive in that the trees that are left may be relatively small and have very little value, but at the next entrance into the stand they may be of much higher value for sawtimber.

The shelterwood method, particularly when used for hardwoods, may have some wildlife habitat advantages over clearcutting, especially for deer. The shelterwood method may involve two or more harvests, and each time a removal cut is made understory plant succession is retarded, an environment for early-successional plants is created, and availability of browse plants is extended.

### **Uneven-Aged Silviculture**

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Uneven-aged stands contain mixtures of at least three age classes (cohorts) that are in competition with each other throughout the stand. These stands are created or maintained by removing single mature trees (single-tree selection) or groups of trees (group selection) usually covering one-half acre or less in size, and thinning if necessary in the remainder of the stand to maintain the proper size class distribution. The uneven-aged method of silviculture is best suited for use in forest types that contain at least one tolerant species that is highly desirable for management, e.g., sugar maple in northern hardwood forests. However, the method can be, and has been, used for both southern pine and southern hardwood forests, but management efforts tend to be far greater than for even-aged silviculture, especially in regards to obtaining adequate regeneration of the desirable species since pines and most desirable hardwoods are relatively intolerant.

For pines, successful use of the uneven-aged method often requires intensive control of more tolerant competing hardwoods and the control will most often have to be done with herbicides. Fire can be used at certain times in uneven-aged

stands but not as frequently as in even-aged stands because of the presence of younger age classes that can be destroyed by the fire. It will take several cutting cycles to convert an even-aged stand to an uneven-aged stand, but once converted it has the advantage of giving a relatively even flow of forest products over time. There is some evidence that the products produced may be more valuable than from even-aged stands.

Most bottomland hardwoods that are desirable for timber or wildlife are fairly intolerant of shade, so use of the uneven-aged method is difficult in these stands because it creates conditions that are more favorable to tolerant competitors. Regeneration must be obtained in a similar manner as for even-aged stands, and once established it must be released as needed to assure survival and a competitive growth rate.

Uneven-aged stands, because of the multi-layered canopy, have often been recommended as providing the very best wildlife habitat and that may be true for species such as squirrels and some native and migrant songbirds, but that type of habitat may not be best for game species such as deer and turkey.

### **Thinning/Improvement Cuts**

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Thinnings are harvests made to reduce the density of the growing stock and promote the growth of the remaining trees. Improvement cuts are designed to upgrade the residual stand by removing trees of less desirable species and trees of poor form or vigor. Harvests in hardwood stands before the final harvest are almost always a combination of thinning and improvement cuts and the two are often combined in pine stands. Thinnings improve wildlife habitat by maintaining or increasing plant diversity in the understory and ground flora. Opening of the canopy permits more light to reach the forest floor and allows pioneer species to be maintained or to re-invade while

promoting the growth of those species and late successional species.

Numerous techniques have been developed for thinning in forest stands. The two most common techniques are row or strip thinning and selective thinning. Row thinnings are often used as a first thinning method in pine plantations with good row integrity, and strip thinnings are used in natural stands and plantations where rows are not easily determined. A common practice for row thinning in pine plantations is to remove every third or fifth rows and selectively thin within the leave rows to remove the less desirable stems and those likely to be lost to natural competition. Row thinnings are generally not used in older pine stands where future crop trees have already been determined by natural developmental processes within the stand. Row thinnings and strip thinnings are generally not used in hardwood stands.

### **Prescribed Fire**

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Fire, either wildfire or intentional burning by native Americans or European settlers, has always been a part of the ecology of southern upland forests. Native Americans used fire as a wildlife management tool and European settlers used it to improve grazing for domestic livestock. Prescribed fires enhance wildlife habitat primarily by controlling plant succession. Many plant and animal species in the South have evolved as a result of frequent burning, and they can not persist when the environment is altered by natural plant succession. Prescribed fires control woody vegetation, release nutrients, produce sprout growth that is more palatable and digestible, and increase seed germination of many desirable plant species, including legumes, forbes and grasses. In addition, the vegetation produced as a result of the fires attract an abundance of insects that are an important food source for quail, turkeys and other birds.

A distinction should be made between fires used for site preparation and site clean up following harvest and prescribed fires used underneath a stand of trees. Site preparation fires are usually very severe (hot) and may consume 80% or more of the available organic fuel. Site preparation burns may be done at any time of the year but are typically used in the summer or fall before planting in the winter. Prescribed fires are far cooler and typically consume less than 50% of the available fuel. They are usually employed in the winter months when fuel and soil moisture levels are moderate to high. Prescribed burning is most effective for establishment and maintenance of wildlife plants when combined with a thinning program that provides more light to the forest floor.

Prescribed burning can be a valuable tool for forest and wildlife management, but it must be used at the right time of the year and under the proper weather conditions to obtain the desired results and not damage the resource. If you are not familiar with the use of fire you should seek the advise of a professional forester or biologist who is experienced in the use of fire. Burns are normally conducted in the winter months and are done within a few days after a rain to insure proper fuel and soil moisture conditions. Provided fuel moisture is desirable, the best days for a burn occur when there is a slow steady wind from the same direction. These conditions will assure that the surface layer of pine needles, grass, and low shrubs fuel the fire but the lower organic layer is not destroyed. The burn should be initiated by starting a "back fire" on the downwind side of the property that burns slowly into the wind. Once the back fire has burned a sufficient distance to establish an adequate fire break, a "head fire" can be started from the opposite side of the property.

Burning schedules can be tailored to create or maintain a favorable habitat for the desired wildlife species. For example, a winter burning schedule of one-to-two years

will maintain a habitat favorable for quail and turkeys whereas a schedule of three-to-five years may provide more browse and cover for deer. Summer or growing season burns may be beneficial in some cases, for example where it is desirable to kill much of the woody vegetation rather than simply killing the top and allowing it to sprout. By converting the understory from primarily woody vegetation to grasses and herbs, an excellent habitat can be created for early successional wildlife species such as quail. Regardless of the wildlife species to be favored, a burning schedule should be developed for the entire property that specifies areas to be burned each year and the timing of the burn. Assistance in preparing such a plan can be obtained from State Forestry and State Wildlife agencies or from consulting foresters and wildlife biologists.

In the past, fire was considered to be detrimental to production of quality hardwoods and great efforts were made to keep it out of hardwood stands, both upland and bottomland, primarily by use of plowed fire breaks that are expensive to maintain and often lead to undesirable environmental effects such as erosion and deposition of sediment into streams.

We now know that prescribed fire can be used effectively in mixed pine-hardwood stands and in upland hardwoods for forestry and wildlife management purposes. With upland hardwoods fire has proven to be a useful tool for maintaining or increasing the oak component of the stand. Fire will top kill oak seedlings and saplings, but oaks tend to have a very vigorous root system and will sprout more vigorously than many of their woody competitors.

Bottomland (floodplain) hardwood sites and upland wet sites supporting hardwoods have generally been protected from prescribed fires by use of plowed fire breaks. However, except under extremely dry conditions, these sites will not support a fire because of the high soil and fuel moisture levels and the nature of the

hardwood litter and ground cover. Most foresters and wildlife biologists now believe there is no need for the fire breaks and that it is best environmentally and ecologically to simply let the fire burn into the wet hardwood areas until the fuels will no longer support a fire.

## **Fertilization**

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Trees on most forest soils in the south will respond to addition of nutrients, primarily nitrogen, but some soils are lacking in other nutrients especially phosphorous. Fertilization is now a common practice in pine plantations especially for short rotations on industry lands. However, it should only be used after soil testing to determine if there is a sufficient deficiency and to obtain a recommendation for nutrients to add.

If fertilization is used, timing of application is important. If added when the trees are too young and do not have a large root system, the nutrients may be captured mostly by competing vegetation. Most recommendations for fertilization call for application at about age 3-to-4 and/or in connection with thinnings, primarily the first thinning in the stand.

Soils lacking in nutrients produce poor quality deer browse and the deer produced will have low body weights and be in generally poor condition. Fertilization of these soils before crown closure and at time of thinning will produce ground flora and understory plants of superior browse quality for deer and food and cover for other wildlife species. In general, most wildlife species will benefit from fertilization of forest stands on nutrient deficient soils.

## **Integration of Wildlife and Forest Management**

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The above section gives brief information on common silvicultural methods and techniques used in the south. All can have benefit for management of wildlife habitat,

depending on circumstances. It should also be noted that all can be modified and tailored to be more specific in addressing wildlife management needs, and that most often this can be done at little or no cost to timber production. These modifications are implemented at both the stand and forest (landscape) level and are based on a consideration of stand and forest conditions, such as stand size, stand age arrangement, edge effects, plant succession, stand structure, and plant diversity that are known to influence habitat for most wildlife species. The following section presents some more common examples of how these modifications can be done.

### **Modifications For Pine Plantations And Natural Stands Of "Pure" Pine**

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*Size, shape, and arrangement of regeneration areas:* This discussion primarily concerns forest game species and most other native wildlife species occurring in the south; larger areas with less edge effect may be preferred for some wildlife species such as some neotropical birds.

The size and shape of clearcuts or regeneration areas determine their usage by wildlife. The center portion of very large regeneration areas may be relatively unused by wildlife. Even the very mobile animals such as deer may use only the outer portions near wooded areas. In addition to providing greater usage of the food resources, use of smaller clearcuts provides more edge effect and therefore more plant diversity than use of large clearcuts. In general, long narrow or irregular shaped regeneration areas offer better habitat than square or circular areas.

If regeneration areas are established in the form of square blocks or circles, it is probably best to limit their size to about 40 acres. Elongated regeneration areas can be much larger in size, perhaps 100 acres or more, and still provide good usage of the food resource and create better edge

effects. Also, the long narrow areas may provide more territories and home ranges for animals and allow them to benefit from the food resource and proximity to cover.

Although there is disagreement among wildlife biologists about placement or arrangement of regeneration areas, it is probably best for most game species in the south to stagger or disperse the regeneration areas so that you do not have large areas of the same or nearly the same age class. One practical way that this has been done is to assure that adjacent regeneration areas differ in age by at least five years. This practice assures proximity of areas of different successional stage and provides great diversity across the landscape. However, it may result in a somewhat fragmented landscape that may not be desirable for some wildlife species.

*Planting at lower densities:* Ideas and recommendations for plantation spacing have varied greatly over the years and there is still wide variation in the spacing used. A spacing of 6' X 6' was very common at one time and plantings of 8' X 8' are still used, although wider spacings seem to be preferred. For timber production, the choice of spacing is best determined by the products to be grown and the markets for products such as pulpwood. Present market conditions may dictate wider spacings since pulpwood supplies exceed demand. Generally, wider spacings (lower densities) are best for wildlife because of greater light penetration through the canopy that permits better growth of desirable plants for food and cover.

*Buffer zones, streamside management zones (SMZs), and wildlife corridors:* Separation of regeneration areas, even though they may differ somewhat in age, by buffer strips of uncut timber (100 feet or so in width) greatly enhances diversity of habitat and provides travel corridors between fragmented habitats. Some timber harvesting can be done in these corridors at the time of the regeneration cut to remove

mature timber or high value trees likely to be lost before the next harvest in the younger stands. However, efforts should be made to minimize equipment travel in the corridors and damage to the ground flora and understory vegetation since they are so important as a food source and for protection of smaller animals.

SMZs are strips of vegetation left adjacent to streams or other bodies of water primarily as filter strips for the protection of water quality. However, they may also serve a very useful purpose in enhancing wildlife habitat. As with buffer strips, they provide travel corridors and enhance plant diversity, but they may, because of the water source, also provide the unique habitat needed for many smaller animals with limited home ranges. State Best Management Practices (BMPs) specify the minimum size of SMZs based on stream size and topography, and the type of harvest activities permitted in the SMZs. Some harvesting is permitted in the SMZs, but for protection of both water quality and wildlife habitat, equipment use and crossing of the SMZ should be limited. For wildlife habitat improvement, it may be desirable to increase the size of the SMZ over that specified by State BMPs and/or to limit the amount of harvesting in the SMZ.

In larger regeneration areas where refugia or travel corridors are not provided by SMZs, it is highly desirable to leave strips of relatively undisturbed vegetation across the area. These strips are sometimes referred to as Habitat Management Zones (HMZs) and should be on the order of 50-to-100 feet wide. Some harvesting can be done in the strips but again it is important to create as little disturbance as possible. One very good use of HMZs is to extend SMZs or connect SMZs so that there is a continuous corridor across the regeneration area.

*Seeding of disturbed areas:* Timber harvesting almost always results in soil disturbance and exposure of mineral soil along roads, logging or skid trails, and on loading decks. Compliance with state

BMPs requires that these areas be treated, including establishment of ground cover, to minimize erosion and maintain water quality. Seeding and establishment recommendations vary widely, but some involve the seeding of non-native material and /or material that has no value for wildlife. Establishment of native ground cover, including native warm season grasses, will be most beneficial to wildlife. A wildlife biologist or other natural resource professional should be consulted for the best mixture for seeding in your area.

*Woody debris/logging residue:* For purposes of nutrient cycling and site improvement, it is generally best to leave woody debris and logging residue scattered uniformly over the site rather than concentrated at the logging deck or other places on the site. Leaving the material, especially some of the larger material, on the area is beneficial to many animals, especially salamanders and small mammals that use it for dens, nests, foraging, and cover. However, leaving some piles of tops and larger material will provide cover for species such as rabbits, quail, and other birds and will not decay as rapidly as the scattered material. The piles can be left anywhere in the harvest area but are best left near edges, bodies of water, or food sources.

### **Modifications For Bottomland Hardwood Stands**

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Most bottomland hardwood stands are managed using natural regeneration methods and long rotations for the production quality sawlogs, so fewer modifications for wildlife habitat may be needed than in pine stands.

### **Preparation For And Supervision Of Harvest Operations**

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Most logging contractors can conduct the silvicultural operations described above effectively for timber production, but are generally not aware of modifications that

may be desired for improving wildlife habitat. It is therefore imperative that the landowner or manager take the necessary steps to assure that the operation accomplishes the desired objectives for wildlife habitat and timber production. These steps in preparation and supervision of the operation should begin long before the harvest contract is awarded and continue even after the harvest until all objectives are accomplished.

Landowners not familiar with preparation and supervision of timber sales would be well advised to secure the services of a consultant forester and wildlife biologist. These professionals can handle, in cooperation with the landowner, all details of the sale from initial inventory/marketing, to layout of the sale area, preparation of the sales contract, advertisement of the sale, supervision of harvest operations, and close out of the tract after harvest. Consultants can receive payment for their services in different ways but the most common is to charge a percentage of the revenue from the sale. As an alternative to using a consultant, the landowner may obtain advice for conducting the sale from their state forestry agency.

### **Pre-Harvest Preparation**

If a Forestry/Wildlife Habitat Management Plan has been prepared it will specify the areas to receive treatment each year and the type of treatment to be applied. Once the area is determined, the following steps should be taken before the harvest or other operation begins.

*Inventory/assessment of treatment area.* The need for an inventory and the type of inventory will be determined by the type of sale used. For regeneration harvests, a timber cruise is normally done to determine volume of timber to be sold by species, product class, and size class. For partial harvests (thinnings), this information is obtained in conjunction with marking of the trees to be removed. An alternative to sales

based on inventory is one where the contractor pays based on the timber actually cut and delivered to a processing facility.

Other assessments that should be done before harvest begins include: (1) location and marking of SMZs, (2) layout and marking of skid trails and stream crossings if necessary, (3) marking of special areas to be protected, (4) location of logging decks, (5) marking of HMZs or wildlife corridors, and (6) location of any special wildlife habitat improvements such as openings and small slash piles. This information should be indicated on a detailed map of the area and a copy of the map given to the logging contractor.

*Marking/delineation of trees to be removed.* The need for marking of trees and how it is done is determined by the type of harvest to be made. For regeneration harvests using artificial regeneration, the trees to be removed are generally not marked since virtually all trees will be cut. The exception to this occurs when some trees are to be removed from areas such as SMZs and HMZs. Also, trees to be left for wildlife purposes within the harvest zones should be marked with a distinctive colored paint. When natural regeneration methods such as shelterwood or seed tree are used, the usual practice is to mark the trees to be retained rather than those to be removed.

For partial harvests (e.g. thinnings) the most common practice is to mark the trees to be removed. A paint spot is placed on the tree at eye level and another at stump level. This permits a check to insure that only marked trees are removed. If row thinning is used, the trees to be removed are not marked, and if trees are removed in the leave rows the logger makes the selection. In the "logger select" method of thinning in older stands, the trees for removal are not marked and the logger makes the selection after thorough training by a professional forester or someone with experience in how the stand should be thinned.



*Preparation of a timber sale agreement and map:* The timber sale agreement and accompanying map are extremely important documents from a legal, financial, and environmental standpoint, but they are also the landowner's primary vehicle for assuring that the result will meet their specific goals for timber production and wildlife habitat. An example of a timber sale agreement is given in Figure \_\_\_\_, but it should be realized that there is no "standard" sale agreement. The agreement should be tailored to fit a particular harvest unit and the specific outcome desired by the owner.

The map accompanying the sale agreement should be drawn at a scale that permits easy recognition of all features discussed in the agreement. Attachment of aerial photographs to the agreement is also highly desirable. These photographs can often permit easier recognition of property boundaries and features such as streams and trails.

In addition to the sale agreement, it is common practice to require the logging contractor to sign a performance bond and establish an account from which funds can be withdrawn by the landowner in case terms of the agreement are not met.

*Sale advertisement.* If a consultant is employed they will know the loggers, timber buyers, and mills that may be interested in purchasing the timber and will handle this aspect of the sale. If the landowner handles the sale, a list of companies and individuals that may be interested in the timber can be obtained from the state forestry agency. The sales contract/bid forms can be sent to the full list of possible bidders or a sales announcement can be sent with a form expressing interest in the sale to be returned by the possible bidder.

*Tour of treatment site with contractor.* Once the sales agreement has been signed and the logging contractor has been identified, the landowner, and consultant if one is involved, should meet with the logging

contractor on the tract to be harvested. This is a very critical time to insure that the landowner and contractor fully understand what is expected of each and what is to be accomplished. The landowner should tour the entire tract with the logging contractor using the map prepared with the sales agreement, making sure that all information on the map and in the sales agreement is fully understood. Most failures in compliance on the part of logging contractors occur because of a lack of complete understanding of what is expected by the landowner.

### **Supervision of Operation**

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The landowner, or their representative, should visit the harvest site on a regular basis, daily if possible. These visits offer a possibility for establishing good working relationships with the logging contractors and to impress on them the importance you attach to satisfactory completion of all aspects of the harvest agreement. If mistakes or a non-compliance are noted, repairs or corrections can be made immediately. Good supervision is the key to accomplishing your desired objectives.

### **Post-Operation Activities**

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Near the end of the harvest, and before the contractor leaves the site, the landowner should visit the site and do a complete inspection with the contractor. If repair work, wildlife habitat work, or other work necessary to meet the terms of the agreement are found, it should be noted at this time and plans made to complete the work before the contractor leaves the site.

After all work is complete on the site, the landowner should again make an inspection to see that all terms of the agreement have been met. It is also the time to make any desirable wildlife habitat changes, such as addition of additional wildlife openings, before site preparation or planting begins.

## Summary

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Silvicultural practices such as regeneration harvests, thinning, improvement cuts, burning, and fertilization are used to improve product quality and production in forest stands, but the same methods may be essential for improving or maintaining wildlife habitat. In many cases the silvicultural practices can be used without modification, but if needed slight modifications can be made to make them more favorable for creating desirable wildlife habitat. If landowners wish to manage a forest area for a combination of timber and wildlife, they must (1) establish their objectives as to the wildlife species they wish to favor, (2) know or establish the habitat requirements of those species as to cover, food, and water in local and landscape areas, (3) determine if these requirements are present or can be established on the property by silvicultural manipulations, and (4) determine if these habitat requirements are compatible with requirements or goals for timber production.

Once the above criteria are met, a forestry/wildlife management plan can be developed that specifies the location, type, and timing of each operation on the forest to best meet the desired objectives for wildlife habitat and timber production

# SOUTHERN HARDWOOD MANAGEMENT

## 19. Integrating Wildlife Considerations With Hardwood Forest Management



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### INTRODUCTION

Because of their great variety, hardwoods have exceptional value as wildlife habitat. The habitats associated with them can be very diverse and develop a high degree of permanence especially as compared to southern pines, which tend to be replaced by hardwoods as years go by and forests mature. This summary describes some of the ways to help desired wildlife in hardwood forests as well as ways to reduce damage done to hardwood habitat by timber harvest.

The term hardwoods in the South refers to a couple hundred or so species of broad-leaved trees. Wildlife in its broadest sense means all that is wild -- plants and animals. For this article, wildlife means a thousand or so species of birds, mammals, reptiles, and amphibians.

### Forest Succession and Wildlife Management

A forest is always changing. Change is most rapid when the forest is young, such as after a wildfire or clearcut. Young seedlings and sprouts compete for light, water and essential elements. There are winners and losers -- some kinds of trees and other plants increase while others decline. Because wild animals directly or indirectly depend on habitat, the numbers and kinds of animals using the land will change as well. This process of change through time, where one living community replaces another, is called ecological succession. Animals that roam widely may visit all forest growth stages that are within their home range. In general, however, undisturbed, mature forests with well-developed understory vegetation and midstory shrubs and trees, as well as occasional openings, offer the greatest diversity of wildlife. In a Louisiana study, for example, 13 species of songbirds were most abundant in early regeneration, 5 were most abundant in seedlings, 1 in pole-size trees, 1 in sawtimber and 31 in mature forests.

### Timber Site Quality vs. Wildlife Habitat Quality

Stands of timber and the sites occupied by these stands are evaluated based on how well trees produce wood and the value of the wood in the trees. All variables can be measured in terms of how much wood a stand can produce. Generally, the quality of wildlife habitats is not as easily measured--one does not normally equate wildlife to meat the way trees are equated to wood. Poor habitats for some animals may be excellent for others. Excellent stands of timber may be poor habitat for certain wildlife species, while poor stands of timber may be excellent for other species. Deep sands, for example, may make poor soil for timber but they are excellent for gopher tortoises and other animals associated with sand hill habitat.

In general, forest habitats that are wetter tend to be more productive. That is, they contain more total living material or "biomass." Likewise, forests that produce more wildlife food in the form of browse, nuts or fruits tend to be considered "better" than those that do not. Mature forests and maintained forest clearings generally tend to be "better" wildlife habitat for many favorite game species. However, certain "poor" habitats may be ideal for some kinds of wildlife. Intermediate successional stages may be preferred for relatively fewer favorite game animals and fewer species of nongame birds.

Animals can also be classified according to their habitat needs as edge species, interior species, specialists, and those that need large areas of generalized habitat. Quail in forest habitat are edge species. They tend to be common in diverse forest habitats featuring lots of edge. A black-throated blue warbler is an interior species. R lives in the interior of large blocks of forest. A gopher tortoise is a specialist. It needs special sandhill\_habitat. Bears are one of those species that need large areas of almost any kind of forested habitat.

### **Values of Hardwoods for Wildlife**

Food production is the most obvious way to value trees as supporters of wildlife. All trees have food value for wildlife. Some food values of trees such as oaks are well known. The value of elms is less known. If you see a squirrel or a flock of goldfinches feeding on elm seeds in the spring then you will know two of the values of elms for wildlife. Table 19-1 shows some commonly known wildlife food values of selected trees.

Sometimes the value of trees as food support for wildlife is indirect. For example, in some years, red mulberry leaves support a good crop of caterpillars in September. Summer tanagers, tufted titmice and migratory warblers feed on these caterpillars. Likewise, the leaf litter under hawthorns provides a valuable foraging habitat for white-throated sparrows and towhees in winter. These little birds need little leaves to scratch in. Large coarse leaves such as those of sycamore offer little scratching habitat for small birds.

A bird watcher might value a certain grove of hardwoods because every spring it attracts a high number of migrating warblers. The warblers follow leaf opening as the season advances northward, providing opportunities to feed on insects. Another place in the forest may be a traditional roost for wild turkeys during the spring -- a fact which only a landowner might know.

### **APPROACHES TO WILDLIFE HABITAT MANAGEMENT IN FORESTS**

Four general approaches are commonly used to manage forest habitat:

1. Protect and maintain habitats as they occur naturally: Let nature take its course and maintain plant and animal communities in more or less intact ecosystems.
2. Coordinate timber management activities to also achieve wildlife habitat enhancement.
3. Manage for timber and accept whatever wildlife is adapted to that habitat. Keeping these approaches in mind, consider your forest as a painting. Do you like the way it looks? Is it full of interesting habitats and animals? If so, you can leave it just the way it is. There is no need to try to improve on nature. However, if you wish to make some changes in the "painting," the main tools at your disposal are chainsaws, fire, plows, seeds and seedlings.
4. Manage a forest for wildlife as a primary goal. If wildlife management is a primary goal you can:
  - a. Manage featured species.
  - b. Enhance diversity.
  - c. Protect and maintain natural communities.

#### **Manage Featured Species**

This approach to habitat management is to emphasize a particular species. Suppose you have a uniform stand of old trees and you want more ruffed grouse and rabbits. You can

Table 19-1. Some wildlife food values of common trees.

*Trees do not necessarily have high or low value for wildlife. A stand of any kind of tree has wildlife value--especially if the trees are mature.*

Species	Remarks on Value of Wildlife
Apple, Crab	Fruits eaten by many games species. Sprouts preferred by deer.
Beech, American	Highly ranked as a food source (nuts, buds, catkins). Nut production in south is inconsistent and unreliable. Manage to increase crown development. Often a good cavity tree.
Cherry, black	Important because of the long fruit-ripening period and frequency of good seed years. Needs full sun or dominant position to thrive.
Dogwood	Because it is widespread, with fruit that persists on the tree into the early winter, it is very important for many game species, especially turkeys and squirrels, as well as songbirds and mice.
Elm, American winged	Produces seeds relished by squirrels, goldfmches, and certain other birds in early spring when other tree seeds are scarce. Seedlings and half cut trees make good deer browse.
Gum, black (tupelo)	Fruit is important, but remains on the tree for only a short period after ripening. Good fall color.
Hickory, bitternut mockernut pignut shagbark	Shagbark and mockernut are considered preferred mast producers for wildlife, especially squirrels. Bitternut is the least preferred. Hickory nuts provide a food source from late summer to the spring. Favor shagbark and mockernut over bitternut when thinning hickories.
Hornbeam, American	Seeds eaten by squirrels.
Hophornbeam, eastern	Valued as a seed producer in midstory.
Maple, red	Produces seeds preferred by squirrels and quail in early spring. Important because of its widespread occurrence.
Mulberry, red	A good food source in midspring. Fruit is available for only a few weeks.

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Table 19-1. Some wildlife food values of common trees.  
(continued)

Species	Remarks on Value of Wildlife
Oak black post southern red swamp chestnut water white willow	Oaks rate high as producers of wildlife food because many animals eat acorns. Water, willow and cherrybark oaks near streams and ponds are important as a food source for ducks. On drier sites, a good balance of species in the white and red oak groups will help maintain a consistent level of mast production. Cherrybark, swamp chestnut, and white oaks are top timber species.
Persimmon, common	Favorite fall fruit for many game animals. Fruit is persistent on tree during years of early frost.
Pine, loblolly shortleaf Virginia	Seeds of southern pines are an important food source for quail, turkey, songbirds and squirrels. Pine hardwood forest provides a great variety of wildlife food.
Sugarberry	Fruits are an important food for turkey and many summer and wintering songbirds. An important seed producer. Thrives on moist sites.
Sweetgum	Songbirds and quail eat seeds; some birds eat buds. Deer, sweetgum sprouts. A preferred food of beaver. In some areas, sweetgum may outcompete more desirable trees.
Yellow-poplar	A prolific seed bearer. Seed will persist in cone and can be used by many birds and some mammals in winter. Deer browse seedlings.
Locust, honey, black	Fallen honeylocust pods are a favorite deer food. Birds and rodents also feed on pods. Seedlings and sprouts are preferred deer browse.
Walnut, black	Nuts are favorite food of squirrels. Fallen nuts keep well. Some last 2 or 3 years.
Ash white pumpkin	Seeds are eaten by a variety of wildlife.

temporarily increase the carrying capacity for these animals by harvesting patches of woods. Thickets that develop in these man-made openings will make the forest better for grouse and rabbits than a forest having only large well spaced trees. The effects would be temporary as the trees grow large. Over time, the thickets, rabbits and ground cover plants will disappear or change. On the other hand, don't cut the forest if gray squirrels are the target species. Gray squirrels prefer mature forests with large oak trees.

### **Enhance Diversity**

A second approach to habitat management is to enhance diversity. This often appeals to small landowners in love with their land and who do not have a favorite species. The greater the variety of trees and plants, the greater the variety of animals that will live there. When removing trees the "scarcity factor" is a major consideration. For example, on land where oaks are common and magnolias are rare, favor the magnolia. Rare species may be particularly important components of the forest ecosystem, and indicators of overall forest health.

### **Protect and Maintain Natural Communities**

A third approach to habitat management is to maintain and protect outstanding natural communities already present on the land. For example, if there is a spectacular stand of a particular forest type, or a grove of picturesque trees, try to maintain them, especially if they harbor desired wildlife populations. Scarce habitats such as sandhills, Carolina bays, streamside forests or forested wetlands can be kept as they are with minimum interference.

## **THINNING A FOREST FOR WILDLIFE**

Thinning means cutting out some trees so the remaining ones can thrive. Many trees must die as a forest develops from seedlings to saplings and then on toward maturity. Thinning will take place naturally if no one interferes. Numbers of trees will decline from perhaps tens of thousands of seedlings per acre down to perhaps a few hundred large trees, in a century or so. This is the normal course of plant succession.

During the decline in numbers of trees, landowners can steer plant succession by removing the less desirable trees to favor those that support preferred wildlife. What is less desirable or more desirable depends on the person's point of view and knowledge. Making decisions as to which trees to remove is relatively easy in a young, managed forest. As a young forest grows, wildlife management considerations can help guide the thinning process. For example, in a mixed forest, removing sweetgums while leaving oaks would favor deer and squirrels. Deer and squirrels dislike sweetgum. as a food source, but both animals relish acorns. Beavers and goldfinches on the other hand, prefer sweetgum. Beavers like the bark and goldfinches eat the flowers and seeds.

Even age stand management for timber can reduce habitat layering. As thinning takes place, the timber producer tends to try to channel as much sun energy and elements into timber producing trees. This tends to reduce vertical layering and habitat variety. This layering is often best developed in old wild, unmanaged forests which have the most diverse wildlife, especially bird life. A natural forest tends to have diverse ground cover, shrub layer, midstory layer of small to medium sized trees with an overstory of dominant trees.

Flowering dogwoods, shadbush, red mulberry, rusty blackhaw, and sparkleberry are examples of small midstory trees that are especially valuable for wildlife.

In general, when thinning a forest with wildlife in mind, look at each tree and ask yourself what is its future as a part of a wildlife habitat. You can cut the tree or leave it, according to your judgement.

When thinning a forest to enhance wildlife and aesthetic values there are no simple rules. The greater the knowledge of the wildlife manager, the more things there are to complicate decisions on what trees to remove. Consider all the potential wildlife values when you look at a tree--seeds, fruit, forage, insects that live on the tree, and the potential for nests and dens. Also consider a tree's individual beauty of form and color changes during the season. Consider

especially the edges of the forest and how the finished job will look from a distance. When thinning for wildlife and aesthetics consider that the forest need not be cut down when it is "finished", but rather, it may remain for lifetimes.

A thinning can be accomplished by selling timber, which removes a tree completely, or half cutting. Half cutting involves partly severing a trunk and then pushing a tree over. Some half cut trees will live for years and provide good ground-cover. Trees can also be cut and left to rot there, providing habitat for animals that need dead wood.

## **CONFLICTS AND TRADE-OFFS BETWEEN MANAGING WILDLIFE AND TIMBER**

Does a young, healthy forest mean healthy wildlife? Modern forest management for timber tends to favor young, vigorously growing trees. Large trees are usually cut when they are economically mature and the land is "rotated" back to the seedling and sprout stages. Such young forests contain abundant wildlife of certain kinds.

Forests of old decadent, diseased trees with their rots and holes, on the other hand, do not mean poor wildlife habitat. Old forests make better habitat for certain wildlife than do young healthy trees. Old forests in a wild condition are becoming rare because they are being replaced by younger, managed forests. If you have an old hardwood forest, you may find management decisions are difficult. This can be especially true if a forest has developed without management. Large, old "decadent" trees may have cavities suitable for squirrels, raccoons, owls, or wood ducks, but the tree likely has little timber value. Old trees use space that productive young timber trees could use. A beautiful, old forest may be crowded with trees that are unproductive economically and yet be a paradise for a diversity of wildlife. Aesthetic qualities, in addition to wildlife benefits, may make timber harvest unthinkable to the landowner even though a forester might recommend harvest to meet economic goals and improve the timber quality of the forest. The conflict is between preserving something culturally or aesthetically valuable versus exploitation for commodities. Therefore, some landowners choose to protect rather than manage their forest for optimum economic return. Even in an intensively managed forest, a few acres of old, unmanaged forest makes an interesting island in time to serve as a reference point and comparison with young forests managed for timber.

## **ROADS AND WILDLIFE HABITAT**

Many kinds of favorite wildlife may be common in forests with roads. However, roads usually do not improve wildlife habitat. Roads tend to facilitate access for vehicles and removal of forest commodities while they can damage wildlife habitat. Making roads is generally the first step in the habitat fragmentation process. Fragmenting habitat into smaller pieces by roads and development can reduce or eliminate wildlife species that uses large blocks of forest. Roads change rainfall run-off patterns and increase the speed of run-off and erosion. Roads along stream tend to be particularly undesirable, due to potential increased sedimentation of stream. Roads can encourage casual visitors, littering, and hunting from vehicles. In general roads decrease wildness.

Roads maintained with broad borders can mitigate some losses by functioning as forest clearings. Roads for occasional use by light vehicles can be made simply by removing enough trees and shrubs to make a passageway. Such roads will last indefinitely without disturbing the earth if they are used only by light vehicles during dry weather when the soil is firm.

## **DEER AND FOREST MANAGEMENT**

Whitetail deer are popular animals with hunters and wildlife watchers. They are adapted to all Southern forest environments. Likewise, deer are compatible with most timber production practices. Almost any timber harvest can be argued as being beneficial for deer because deer use forests at all stages of succession- Early forest stages can provide browse, intermediate stages provide cover for hiding; mature forests can provide preferred foods such as acorns. All harvests,



including clearcuts, create more browse, although this benefit is temporary. Harvest of oaks and other fruit and nut trees may hurt food production. Only when deer management becomes intense do trade-offs with wood production normally create conflicts. In general mature hardwood forests with abundant oaks provide plenty of food for deer in fall. This food declines during the winter. Mature forest habitat is often fair to poor for deer in spring and summer.

## **NEST BOXES**

Timber management emphasizes sound, healthy trees that have commodity value. In such forests, lack of nest and den sites may limit certain wildlife populations, so the use of nest boxes will likely be beneficial. Table 19-2 gives specifications for wildlife nest boxes. If nest sites are a limiting factor, nest boxes can increase populations of raccoons, squirrels, certain owls, and some hole nesting songbirds.

## **MAKE A MANAGEMENT PLAN FOR WELDLIFE AND TIMBER**

Most landowners have diverse goals for their forests which include both protection and integrated wildlife and timber plans, depending on the habitat. If you are an experienced forest manager and you spend a lot of time on your land, you can keep your management plan in your head. But because there are so many possibilities for managing a forest to favor wildlife and timber, it pays to make a written plan. Basically, a forest management plan for wildlife, timber and other values includes identifying the features of the land and the plans to protect or manage each part.

### **What Does a Management Plan Do?**

A management plan considers all aspects of land management. It helps you achieve goals, avoid losses and helps keep you from falling behind in your work. It can be simple or complex. The more care and thought you put into your plan, the more you will get out of it. Working on a Plan makes you think about your forest. Planning helps you enjoy your forest more.

A management plan is an inventory. It is a summary of the current condition of the land and all its resources of interest to the landowner. An inventory can include geographic, recreational and wildlife features. It should include more than trees. An inventory is a kind of snapshot of a changing condition. It serves as a reference point against which you can view change and measure success.

A management plan predicts changes and includes predictions based upon past growth rates and estimates of site indices, for example. Also, it includes your own personal plans.

A management plan schedules tasks to achieve goals. Goals might be to improve timber stands, regenerate new trees, preserve special areas, cut firewood or timber, or establish food plots for wildlife. To make a management plan you need knowledge and skills. If you are short of skills, get information and help from the Extension Service, or state forest or wildlife agencies, private consultants or other professionals. As time goes by, experience will increase your capabilities.

### **Tips for Making Your Management Plan**

#### **1. Inventory Your Resources**

Start management plan by making notes as you roam around your forest. Identify boundaries. Get a topographic map, a soil map and an aerial photograph. These may be available from U.S. Geological Survey, ASCS office or Soil Conservation Service offices. Next make a map that shows details of the land: roads, trails, fences, power lines, buildings, and stands of trees according to species and size.

Also make note of streams, marshes, ponds, rocky outcrops, sandhills, animal burrows, den trees, nesting sites of unusual birds, rare plants, old house sites, Indian artifact sites and anything else that interests you. Identify features on the map with names or numbers. Make notes on the

*Table 19-2. Summary of specifications for some wildlife nest boxes. Nest boxes can substitute for tree cavities for many birds and mammals. Note - entrance holes do not need to be round - square or triangular holes are ok.*

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<u>Birds</u>	<u>Hole size diameter</u>	<u>Approximate box dimensions</u>
	-----inches-----	
House wren	1	5 x 5 x 10 high
Prothonotary warbler	1 1/4	5 x 5 x 10 high
White breasted nuthatch	1 1/4	5 x 5 x 10 high
Chickadee	1 1/8	6 x 6 x 12 high
Eastern bluebird	1 1/2	6 x 6 x 12 high
Crested flycatcher	1 3/4	6 x 6 x 12 high
Flicker	2 1/2	7 X 7 X 24 high
Screech owl	3	9 X 9 X 16 high
Wood duck	3" high, 4" wide (oval hole)	11 x 11 x 24 high
Barred owl	8	13 x 13 x 24 high
 <u>Mammals</u>		
Gray and fox squirrel	3	8 x 8 x 15 high
Flying squirrel	2	8 x 8 x 15 high
Raccoon	5 high x 9 wide	13 x 13 x 24 high

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ecological development of your stands or habitats. For example, you might note dates and locations of previous fires or grazing, beaver damage, soil erosion, soil type, timber harvest, and areas of young seedlings. List wildlife species that are likely to occur on the land, with notes on where these animals occur. The greater your appreciation and knowledge of wildlife the more decisions you need to make. If you need help, hire a qualified wildlife biologist.

After your map is complete, make a cruise of each stand of trees. A timber cruise details the number of trees of each kind and size class bearing the name or number of the section of the map to which it applies. The cruise gives the volume and value of your wood products. It enables you to show a timber basis value so you can deduct the cost of your timber at the time of land purchase from future sales. Hire a professional forester if you are uncertain about your ability to cruise timber.

## **2. Predict Changes and Make Plans**

After your inventory is complete, determine your goals for each forest stand, habitat type or special area. These are your management units. Consider these factors when you choose your management goals for each management unit.

- a) How rare is the habitat?
- b) What is the present timber value?
- c) What is the timber potential?
- d) What present and potential wildlife does it support?
- e) What are your recreational interests on this property?
- f) What is its value for subdividing and building?
- g) How long will you own the land?
- h) What are likely to be the goals of children, future owners, or buyers?

Some management units may be for income production, while others may be for recreation, preservation, or other goals.

## **3. Schedule Tasks to Achieve Goals**

Make a list of jobs for each management unit. For example, a stand of young hardwoods might need thinning. Estimate how many years will elapse before a stand needs cutting, based on current growth. Plan for access roads. Plant groves of mast-bearing trees, or thin an existing forest to make a grove by taking out all but the desired species. Plan for nest boxes if den trees are scarce. Schedule regular seasonal jobs such as planting wildlife food patches, hay mowing, and equipment maintenance.

Some places in your forest don't need work. They need protection. Streamsides and water edges need special care. A rocky outcrop surrounded by picturesque oaks and wildflowers might be such a place. Do you have a favorite swimming hole or picnic spot? Plan to exclude logging equipment from favorite spots during timber harvests.

After you select management practices for a stand, write them down. Update the management plan every 5 to 10 years. A complete management plan for a diverse tract of land might be a large complex document. On the other hand, an informal management plan could be as simple as an annotated sketch map.

## **PRACTICES THAT MAY FAVOR WILDLIFE**

No simple wildlife management practices will work in all situations. Here are some suggestions to consider, depending on your wildlife habitat management goals.

1. Design timber harvest to favor wildlife diversity. Identify what wildlife communities you wish to perpetuate.
  - a) Harvest, thin, or protect certain areas from timber harvest, depending on wildlife to favor.
  - b) Plan edges of cuts to be wavy and irregular to increase the amount of habitat edge.

- c) Leave forests uncut along stream and drains to maintain corridors of undamaged streamside habitat. Keep logging equipment away from streams to protect stream banks and maintain water quality.
  - d) Leave forest corridors for wildlife travel lanes between patches of woods and along roadsides.
  - e) Leave a few clumps of large trees in clearcuts.
  - f) Leave den trees. Large den trees are much more rare and valuable than small ones.
  - g) Spare some good seed- and mast-producing trees such as persimmons, crabapples, dogwoods and oaks during harvest.
  - h) Pile logging slash to make brush piles.
2. Use prescribed fire in openings. Set back plant succession and maintain browse plants.
  3. Plant roads, clearings, odd areas, and log loading decks to wildlife foods.
    - a) Plant clovers, ryegrass or wheat or other cool season crops in late summer to produce fall, winter, and spring forage.
    - b) Plant browntop millet or sorghum or other warm season crops for summer and fall wildlife food.
    - c) Plant field borders or clearings to bicolor lespedeza, to make thickets and feeding areas for quail.
    - d) Plant nut and fruit trees in permanent wildlife food patches and clearings. Oaks, persimmons, pears, chestnuts, and crabapples are good choices. Pick trees adapted to your area. Protect seedlings with a wire mesh cylinder when young or deer and rabbits will eat them.
  4. Use good harvest systems.
    - a) After harvest or thinning, leave piles of logging slash unburned. Bobcat, fox, raccoon, rabbits, and other small game will den in those places.
    - b) Protect fragile or rare groundcovers. Consider natural regeneration in such areas. In hardwood forests, ground covers of Lycopodium, certain wild flowers, or rare plants may be damaged by logging.
    - c) Avoid site preparation or other soil disturbance near stream , gullies or other erosion-prone sites.
  5. Install artificial nest boxes for owls, songbirds, wood ducks, squirrels, raccoons, and other cavity-nesters. Nest boxes can increase populations in areas where den trees are -scarce. Get plans from your county agent. Don't put nails into trees with timber potential. Attach nest boxes to branches, not main stems.
  6. Inventory and protect rare animals or plants and their habitats.
  7. Protect grapevine and other fruit-producing plants useful to wildlife.
  8. Harvest deer during the hunting season to maintain deer populations at a level where they won't harm the habitat.
  9. Ask a qualified wildlife biologist for advice on specialized management problems. "Certified wildlife biologist" is the professional designation for qualified wildlife managers.
  10. Read books and articles on wildlife management.

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# Trail Riding



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# The University of Georgia

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**Center for Agribusiness and Economic Development**

**College of Agricultural and Environmental Sciences**

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## Considerations for Getting Started in the Horse Trail Riding Business

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**Kent Wolfe and Christopher Ferland**

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## Considerations for Getting Started in the Horse Trail Riding Business

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# **Considerations for Getting Started in the Horse Trail Riding Business**

**Kent Wolfe and Tucker Price**  
**Market/Finance Specialist and Quitman County Extension Agent**

## **Introduction**

The Center for Agribusiness and Economic Development (CAED) and the Quitman County Extension Service worked with an area farmer to investigate the horse trail rider industry in Georgia. After lengthy discussions with the Georgia Horse Council (GHC) and other professions working in Georgia's horse industry, it was determined there is a lack of reliable data pertaining to the trail riding industry. There are a number of significant factors that need to be considered before a horse riding trail facility is constructed.

## **Study Methodology**

The CAED implemented a mail survey to horse club members across Georgia. The survey was administered during March through June, 2003, and a total of 153 completed surveys were returned. The survey targeted riders who trailer their horses to visit horse trails. Survey samples are subject to some amount of error, i.e., the results obtained from the limited sample will vary from the results obtained if the entire population was interviewed. The margin of error associated with a sample of 153 adults is  $\pm 8.8\%$  at the 95% level of confidence.

## **Demographics - Target Market**

To effectively perform a marketing analysis the target market must be identified and described, a competitor analysis should be developed, and a situational analysis created. This section involves generating a detailed description of potential customers and involves identifying the sub-segment of general population most likely to utilize riding trails.

The more detailed information obtained about trail riders, the easier it is to estimate the market potential and develop an effective promotional and advertising campaign. For example, not all horse owners ride trails. Trail riding facilities also need to identify which segment of the horse owner population ride trails to allow them to focus their marketing efforts on the preferences of the general horse owner population that is most likely to visit their facilities.

By identifying a target market, it is possible to estimate the total market potential for a product or service. This simple calculation provides information on the market potential which is critical in evaluating the feasibility of a particular business endeavor. If the target market potential is not large enough to cover the businesses's operating costs, the business endeavor should be reevaluated.

The demographic information in Table 1 provides a description of the survey respondents and can be extrapolated into a generalization of the target market or typical trail rider. Summarizing the data in Table 1 suggests that the typical trail rider is a married, affluent, white female, with some college education residing in a rural area.

<b>Table 1. Characteristics of Georgia Horse Trail Riders</b>	
<b>Gender</b>	<b>Percentage</b>
Male	16%
Female	84%
<b>Educational Attainment</b>	
Less than highschool degree	7%
High school	13%
Some college/tech degree	36%
College graduate	34%
Advanced work/degree	11%
<b>Age (mean and median) Years if Age</b>	47 & 46
<b>Ethnicity</b>	
White	98%
Other	2%
<b>Total Household Income</b>	
<b>Percentage</b>	
≤\$25,000	4%
\$25,000-\$34,999	10%
\$35,000-\$49,999	10%
\$50,000-\$74,999	17%
\$75,000-\$100,000	31%
\$100,000+	27%
Mean Household Income	\$62,500
<b>Residence</b>	
City	2%
Suburban	20%
Small City	17%
Rural	61%

Source: CAED Horse Trail Rider Survey

## Market Potential

Are people willing to travel outside of their immediate area (self defined) to ride horse trails? This question is critical in estimating the market potential for a trail riding facility. If trail riders typically stay within their immediate area, the market potential is limited to a very specific geographic area, but if riders are willing to travel outside their immediate area the market potential is greatly increased. According to the survey results, all of the respondents trailer their horses and travel outside their immediate area to ride trails.

To obtain a better estimate of the trail riding market potential, it is important to determine how far riders are willing to travel one way to ride trails. The distance data reflects that only riders who travel outside of their immediate area ride trails, 98%. The riders indicated that they are willing to travel as little as ten miles and as far as 500 miles to ride trails. The average and median distances riders are willing to travel one way are calculated to provide insight into the distance traveled to visit a trial riding operation (Table 2).

The majority of the respondents reside in rural areas which is encouraging for this proposed operation. There was initial concern that riders living in small towns and rural areas would have ample access to trail systems in their immediate area, i.e. local farm land, logging trails, or park lands.

<b>Miles</b>	<b>Percent</b>
Less than 50	16%
50-100	35%
101-150	12%
151-200	14%
200 or more	23%
Mean	153
Median	100

Source: CAED Horse Trail Rider Survey

It is also important to determine how many annual trips riders make outside their immediate area to accurately estimate the market potential (Table 3). The riders take anywhere from one (1) to 35 riding trips per year but on average, they take eight (8) trips annually. This is encouraging as riders are more likely to visit different parts of the state to enjoy different trails, scenery, and wildlife. There does appear to be a very dedicated group of riders that take more than 10 trips

annually to different trails. Attracting these riders and presenting them with a satisfactory experience will likely be critical to establishing a successful trail riding operation. Riders rely heavily on word-of-mouth to learn of new trail riding facilities and to evaluate existing ones (Table 10). Frequent riders are more likely to communicate with potential riders given their involvement in the sport and their approval and/or recommendation will most likely define quality of the facility and determine its reputation in the industry.

<b>Table 3. Number Trail Riding Trips Taken per Year</b>	
<b>Trips</b>	<b>Percent</b>
Less than 5	41%
5 to 10	37%
11 to 15	10%
16 or more	12%
Mean	8
Median	5
Source: CAED Horse Trail Rider Survey	

The survey results indicated that riders travel in groups of five to seven people when they visit trail riding operations. This information is important when planning, developing, and laying out the facility. Riders in groups would most likely prefer to trailer their horses and camp near each other. These results are encouraging because if the riding facility can be brought to the attention of one rider and convince them to patron the facility, chances are they will bring other riders. This reiterates the importance of generating positive word-of-mouth advertising.

Table 4 indicates that riders spend an average of three days and two nights away from their home when they embark on a trail riding trip outside their immediate area. This provides additional opportunities for the trail riding operator. Trail riders need to feed themselves and their horses and may need to purchase grocery items, clothing items, and horse stock. The trail riding operation may want to consider opening a general store on the premises to provide visitors easy access to supplies. Horse stock products, souvenirs, crafts, and general merchandise could provide an additional revenue generating activity with high profit potential due to convenience. For example, if a halter breaks, the rider could purchase one at the general store or if the rider does not want to transport food products, they can purchase those as well. Given riders propensity to take over-night trips, they need to be informed of the facilities general merchandise and horse stock store.

<b>Table 4. Number of Days/Night Spent at the Riding Facility</b>			
<b>Days</b>	<b>Days Away from Home (%)</b>	<b>Days at Facility (%)</b>	<b>Nights at Facility (%)</b>
0	2%	1%	11%
1	19%	15%	16%
2	29%	33%	49%
3	24%	29%	10%
4	11%	10%	5%
5	7%	7%	4%
6 or more	12%	5%	5%
Mean	3 days	3 days	2 nights
Median	2.8 days	3 days	2 nights
Source: CAED Horse Trail Rider Survey			

On average, riders pay \$14.00 per night to camp with their trailers at trail riding facilities. The cost per night ranges from no cost to a high of \$40 per night (Table 5). To be competitive, the camping facility should charge between \$10 and \$20 per night, depending on the amenities being offered at the facility. The more amenities, the more the riders would expect to pay. However, the price should not deviate greatly from what the riders are currently paying or they will decide to ride elsewhere.

<b>Table 5. Cost per Night to Camp at Facility with Trailer</b>	
<b>Dollars</b>	<b>Percent</b>
\$0	4%
\$1 - \$4	4%
\$5 - \$10	28%
\$11- \$15	28%
\$16-\$20	23%
\$21-\$25	9%
\$26 or more	4%
Mean	\$14.91
Median	\$15.00
Source: CAED Horse Trail Rider Survey	

It is important to determine when riders are most likely to utilize a riding facility. Table 6 indicate riders are most likely to take trail riding trips during the fall and spring, followed closely by summer. Riders are significantly less likely to take riding trips during the winter. Determining seasonality can help the facility operator in marketing the facility as well scheduling, maintenance, employees, and on-site supplies. For example, the lull in winter activity might be addressed by offering “*ride free*” specials where the riding fee is forgiven but camping fees are collected. Closing the facility during the winter months could possibly free the operation to pursue additional revenue generating activities like hunting.

<b>Table 6. When Trail Riding Trips are Taken</b>	
<b>Season</b>	<b>Percent</b>
Fall	31%
Spring	29%
Summer	25%
Winter	18%
Source: CAED Horse Trail Rider Survey	

Trail riders have varying skill levels and it is important to provide trails with varying difficulty. The data in Table 7 provides an indication of how trail riders rate their ability. The majority of riders classify themselves as intermediate and advanced. Based on these findings, a riding facility should focus on providing intermediate and advanced trails and then incorporate expert and beginner trails. There are a significant number of competing trail riding facilities

available to riders and it is important that a new operation provide riders with these types of trails. One respondent indicated that they did not like trails that were not challenging. Assuming that this mentality transcends each skill level, intermediate, and advanced riders would become bored with beginner trails and may decide to travel elsewhere in search of more challenging rides. The trails should be challenging enough to keep the riders attention, generate excitement, provide beautiful scenery as well as offer a safe riding environment for both the rider and the horse. Remember, it is easier to sell something people want than it is to sell something that is easy to produce.

<b>Skill Level</b>	<b>Percentage</b>
Beginner	16%
Intermediate	59%
Advanced	45%
Expert	14%

Source: CAED Horse Trail Rider Survey

The study investigated the dollar amount riders are currently paying to ride trail facilities. Again, this is very important as it provides a basis for setting riding fees and ensuring the facility is not priced out of the market. The fees riders are charged for trail access ranged from free to a high of \$80/day. Table 8 provides a breakdown of what riders say they pay for access to half-day, full-day, and weekend trail rides.

On average, half-day rides charge approximately \$5.60 for access. Full-day trail ride access is about double the cost at \$9.56 of a half-day while weekend access typically costs \$14.56 per day. This information provides a starting point in determining trail access fees as well as a dollar figure used in estimating the operations revenue.

<b>Dollars</b>	<b>Half -Day Rides</b>	<b>Full-Day Rides/Day</b>	<b>Weekend Rides/Day</b>
\$0 - Nothing	23%	7%	9%
Less than \$5	51%	45%	17%
\$6 to \$10	20%	30%	11%
\$11 to \$15	1%	7%	7%
\$16 to \$20	1%	7%	12%
More than \$20	4%	5%	13%
Mean	\$5.57	\$9.56	\$14.56
Median	\$5.00	\$5.00	\$10.00

Source: CAED Horse Trail Rider Survey

In addition to determining distances riders are willing to travel, amenity preferences, and fees for accessing trails, it is very important to determine potential riders willingness to visit the proposed Southwest Georgia riding facility (Table 9). On average, the results indicate that riders are somewhat likely to patron the operation. However, the data suggest that over one-third (38%) of the riders responding to the survey are very likely to visit the riding trail as described in the survey (**How likely would you be to use a horse riding trail operation in Southwest Georgia with over 25 miles of wilderness trails that offers pasture boarding, stables, camper pads with full hook-ups if it were reasonably priced?**). An additional 30% of the riders indicated that they would be somewhat likely to ride the Southwest Georgia trail operation. These results are very encouraging and suggest that there is an existing opportunity to attract riders to the proposed facility. However, the facility will have to advertise and market the trail riding facility effectively to inform potential riders of its existence as well as to entice them to visit the operation.

<b>Dollars</b>	<b>Mention</b>	<b>Percentage</b>
(4) Very Likely	18	38%
(3) Somewhat Likely	12	30%
(2) Somewhat unlikely	13	15%
(1) Very Unlikely	14	17%
Mean	2.87	

Source: CAED Horse Trail Rider Survey



## Informing Potential Riders

The ability to effectively reach riders will be critical to the success of the proposed facility. The survey asked riders where they look for information on trail riding facilities, this information is located in Table 10. These communication channels need to be exploited by trail rider facilities to effectively reach potential riders. The Internet is a very effective tool in reaching and communicating with potential riders. The proposed facility will need to construct a website and develop links with other organizations associated with horses, i.e., club websites, Georgia Horse Council, and magazines. Word-of-mouth is critical to the success of a trail riding operation as it was mentioned second most often as how riders learn of trail riding facilities. Word-of-mouth may be more critical to the operations success because negative word-of-mouth can actually hurt business by dissuading potential riders. In addition, it is important to develop traditional marketing materials (brochures, business cards, 800 numbers, etc..) and distribute this information to horse clubs, tack and feed stores, and other organizations involved in the horse industry.

Source	Number of Mentions	Percentage
Internet	29	51%
Word-of-mouth/referrals/network	24	42%
Horse clubs/club newsletter	12	21%
Horse related magazines	11	19%
Trail Rider Magazine	7	12%
Stable Mates	5	9%
Market Bulletin	4	7%
Tack and feed stores	4	7%
Newspaper	4	7%
GA Horse Council	3	5%
GA State Parks Guide book	3	5%
Judge list	2	4%
GA Equine Rescue League	1	2%
anywhere	1	2%
Other	4	7%

Source: CAED Horse Trail Rider Survey

## Facility Requirements

Riders were provided a list of amenities that might be available at a riding facility (Table 11). This list of amenities is very important. Riders have a choice of where they ride and if a facility is not rider or horse friendly, i.e., offer the amenities they demand, they will choose to ride elsewhere. Therefore, before any trail riding facility is constructed, it is important to consider what the riders expect to find at the riding facility.

Based on riders responses, the inclusion of various amenities can be broken down into four levels of importance. The first level includes access to water, restrooms, and camp grounds. Specifically, the most important amenity appears to be access to water near the parking facility.

Eighty-six (86%) percent of the riders indicated they want water faucets located near the parking area. Three-quarters of the riders indicated they would like to have access to restroom facilities. A number of the riders wrote in that at least, provide port-a-potties. Having an on-site campground is important as well. Again, the majority of the riders indicated that they camp with their horses when they travel to trail riding destinations. These three amenities were mentioned more often than other amenities and should be provided by a trail riding facility.

The second tier amenities, shower facilities, barns and stalls, and picnic area/grills are less important than the aforementioned amenities, but they are still very important to the riders and should be included in the operation. The third tier amenities include trailer pads and pasture for horses. The changing facilities and general store and tack shop do not appear to be important to riders but can easily be incorporated into previously mentioned amenities at a minimal cost. For example, when the toilet areas are constructed, build a space to allow riders to change clothing. The trailer pads will be part of the camp sites and a pasture area could be incorporated into the barn/stall structures.

The availability of a general store, tack shop, feed products, and guided tours do not appear to be very important to riders. However, the inclusion of the general store, tack shop, and animal feed products provides another profit center for the facility. Having access to food and supplies may not be important to the riders until they forget to pack the appropriate supplies or experience equipment failure, i.e. a broken halter. A simple retail establishment offering refreshments, basic tack, and hay could be incorporated into the operation easily and provide tremendous profit potential.

<b>Table 11. Georgia Trial Riders Desired Riding Facility Amenities</b>	
<b>Amenities</b>	<b>Percent</b>
Water Faucets located close to parking	83%
Toilet facilities	74%
Camping area	65%
Shower facilities	46%
Barns/stalls	39%
Picnic area/grills	35%
Pads for trailers	27%
Pasture space for horses	25%
Changing facilities	13%
Grocery/convenience store	12%
Cool down/walking ring	8%
Horse grooming facilities	6%
Availability of feed and hay	6%
On-site tack shop	5%
Guided tours	3%
Source: CAED Horse Trail Rider Survey	
- - Values above this line are significantly higher than the numbers below the line.	

Beside physical amenities, the riders were presented with a list of other facility characteristics and asked what if any of these are important in their decision to patron a trail riding facility (Table 12). Scenery and appearance and offering trails of varying difficulty are rated significantly more important to riders than other characteristics. The presence of wildlife is also to be important to riders as is the friendliness of the people that work at the facility. These four issues must be addressed by the proposed facility as they are important to riders and impact their decision to visit a trail riding facility. Failure to address these issues effectively may negatively impact riders decision to visit, revisit, or recommend the operation to other riders.

Q#16a	The scenic appearance of the attraction	80%
Q#16e	Offers trails of varying difficulty	74%
Q#16d	The presence of wildlife	55%
Q#16f	The friendliness of the people that work there	51%
Q#16b	Historical attractions	15%
Q#16h	A restaurant or snack bar	13%
Q#16c	The availability of associated activities	7%
Q#16g	Proximity to other tourist attractions, hotels, and restaurants	9%
Source: CAED Horse Trail Rider Survey - - Values above this line are significantly higher than the numbers below the line.		

The Riders were asked what other activities they partake in when they travel to a trail riding destination to determine if area or regional activities should be included in the marketing material. It appears that the riders do participate in additional activities while on riding trips and these need to be considered when developing the trail network. Walking and hiking trails should be considered near the camping facility and include scenic property that allows the riders to enjoy the outdoors and take photographs. These trails should be separate from the horse trails to allow riders to enjoy different landscapes, scenery and wildlife as well as to limit horse and hiker interaction.

<b>Table 13. Other Activities Trail Riders Participate During a Riding Trip</b>		
<b>Question</b>	<b>Activity</b>	<b>Percent</b>
Q#17a	Hiking or walking	33%
Q#17k	Swimming	33%
Q#17i	Photography	32%
Q#17n	None	25%
Q#17n	None	25%
Q#17d	Fishing	23%
Q#17g	Visiting parks	17%
Q#17f	Birdwatching	15%
Q#17j	Visiting local museums	14%
Q#17e	Visiting antique shops	14%
Q#17l	Other	11%
Q#17c	Bike riding	9%
Q#17h	Visiting wineries	7%
Q#17b	Boating	5%
Q#17m	Hunting	3%
Source: CAED Horse Trail Rider Survey		
- - Values above this line are significantly higher than the numbers below the line.		

## **Competitor Analysis**

The competitor analysis focuses on identifying competitors and collecting pertinent operational information. This analysis investigates primary trail riding facilities in Georgia, Alabama, and North Florida. The CAED working with The Georgia Horse Council compiled a detailed list of trail riding operations in Georgia and a marginal list of operations in the surrounding states. However, the CAED is still collecting information on the amenities available at the various trail riding operations. The following competitor analysis is based on the information that is currently available and will be updated as new information is collected.

Sixty-six (66) public and private horse trail riding operations were identified across Georgia. The majority of these operations are located above the fall line (Macon North). A working list of the operations and available amenities can be found in Appendix A.

Examinations of competing operations revealed that 17 have camping facilities. The actual trail millage appears to vary significantly by trail operation. Trail range form a quarter of mile at

one operation to over 8,000 acres of trails at another. The 2,400 acre trail riding facility being proposed in Southwest Georgia does appear to be large enough (actually larger than most existing operations) to compete with existing riding operations.

Nine of the competing riding operations have horse stalls and five offer boarding services. Riders indicated they would like to have a barn or stall facilities to board their animals while they are visiting the operation. Providing stalls or a barn may provide the facility a way to differentiate its operation and be more competitive. In addition, eleven riding operations offer rental horses to their visitors. This may be something to consider once the facility is operational as it expands the market potential to people who like to ride but do not have their own horses.

### **Situational Analysis**

Many people are turning to the horse industry to improve their quality of life. Horses are provide people access to various leisure and hobby activities and a function as an educational tool for youth. There are a number of state-level breed and sport associations in Georgia with large membership lists which are continually attracting new members. Interest in horse related activities such as reining and team roping has increased the number of organizations and businesses that cater to specific events. Horse breed associations have also seen an increase in participation in recent years at exhibitions which is attributed to involvement among novice and amateur competitors. In addition, numerous organized activities are being developed and directed to expand interest and participation in non-arena activities, i.e. noncompetitive pleasure riding and trail riding<sup>1</sup>.

The equine industry in Georgia has been growing rapidly over time. In 2000, horses ranked number nine in revenue (\$169,977,000) in Georgia's Farm Gate report. In 2001, the industry has grown to \$184,883,000 moving up a place to eighth in the Farm Gate report. In 2001, there were 74,995 horses in Georgia, up from 69,820 just a year earlier. The horse segment is the fastest growing sector of Georgia's agricultural industry.

At the same time, Georgia is experiencing tremendous growth. Georgia's population has increased by approximately two million people over the last 10 years. This population growth has fueled urban sprawl and the development of rural areas. As more people become in the horse industry who do not live on the farm, finding a place to ride horses is becoming increasingly more important. This problem is being exacerbated by conservation groups that are lobbying and trying to pass regulations barring or limiting horse access to public lands citing their negative environmental impact.

It is estimated that there are over 1,000 boarding facilities in the state of Georgia. Assuming these people do not reside on a farm, there is a significant number of horse owners across the state in need of a place to ride their horses. For example in 2001, roughly 39,000 horses fell under Georgia's Farm Gate classification boarded, trained or breed.

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<sup>1</sup>WCR-3987 - Oklahoma Horse Industry Trends, David W. Freeman, OSU Equine Extension Specialist

The growth in non-farm horse ownership as indicated by Georgia's boarding facilities, combined with rural development and restrictions being placed on public lands is creating new opportunities for trail riding facilities in Georgia.

# **The Center for Agribusiness & Economic Development**



The Center for Agribusiness and Economic Development is a unit of the College of Agricultural and Environmental Sciences of the University of Georgia, combining the missions of research and extension. The Center has among its objectives:

To provide feasibility and other short term studies for current or potential Georgia agribusiness firms and/or emerging food and fiber industries.

To provide agricultural, natural resource, and demographic data for private and public decision makers.

To find out more, visit our Web site at: <http://www.caed.uga.edu>

## **Or contact:**

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The University of Georgia and Fort Valley State University, and the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service offers educational programs, assistance and materials to all people without regard to race, color, national origin, age, sex or disability.

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**CR-03-08**

**July 2003**

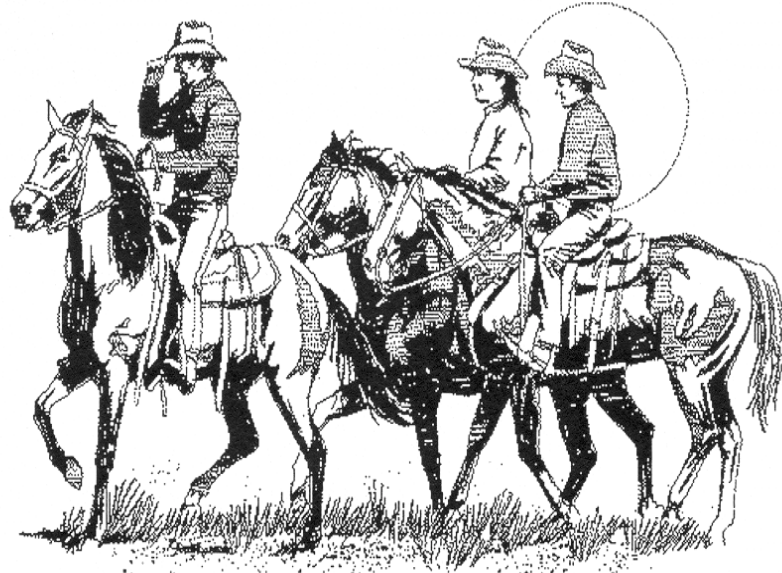
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Issued in furtherance of Cooperation Extension Acts of May 8 and June 30, 1914, the University of Georgia College of Agricultural and Environmental Sciences, and the U.S. Department of Agriculture cooperating.

**J. Scott Angle, Dean and Director**



# Handbook for Ranchers & Farmers



## Equestrian Trail Riding as an Alternative Agricultural Enterprise



## INTRODUCTION

In the spring of 1999, representatives from Texas Equestrian Trail Riders Association (TETRA), Texas Agricultural Extension Service (TAEX), Texas Farm Bureau (TFB) and Texas Southwest Cattle Raisers' Association (TSCRA) came together to discuss the needs of Texas equestrians and Texas ranchers. The groups' goal was to determine if a collaborative strategy could be developed which would address the concerns of trail riders, ranchers and farmers. The concerns we discussed were:

- depressed status of agriculture
- limited amount of public land available for equestrian trail riding
- limited awareness by urban Texans regarding the agricultural story in Texas
- growing number of Texans interested in equestrian trail riding
- fascination by non-ranchers with the ranching life style
- need for alternative sources of income to enable ranchers to maintain their life style

The outcome of these discussions was the creation of the Ranch Based Trail Ride Task Force.

The role of the task force was to develop demonstration ranch-based trail rides and to collect information to explore trail riding as an alternative enterprise for Texas ranchers and farmers. The task force scheduled four rides in the fall of 1999:

- *Miller Ranch*, Marfa, Texas, October 1, 2, 3
- *Southland Land & Cattle Company Ranch*, Kaufman, Texas, October 15,16, 17
- *Walnut Creek Ranch*, Water Valley, Texas, November 26, 27, 28
- *33 Ranch*, Kenedy, Texas, December 10, 11, 12

Through the development of these rides, the task force learned a lot. This handbook is the task force's attempt to provide this information to interested farmers and ranchers. It looks at what we found to be the relevant issues.

**Initial Considerations** - Questions which will help interested persons better understand about a ranch-based trail ride.

**Liability Issues** - Rancher/farmer liability is discussed and strategies are presented.

**Survey Findings** - Information gathered from the ride attendees.

**Helpful Contacts** - Organizations that can help ranchers/farmers get started.

**Concluding Thoughts** - Some ideas to help ranchers/farmers decide how to get started.

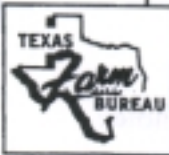
**Examples** - Literature which was developed for the demonstration rides.

Ranch-based trail rides are certainly not the complete answer to address all the concerns the task force identified. Trail rides are an economically viable option for some ranchers/farmers and will provide additional riding options for equestrians throughout Texas.

Through our year of working together, the task force was able to attain some goals which went beyond the scope of the project. We saw that individuals, with seemingly divergent needs, can get together and listen to each other. Through these discussions we many times determined that under our surface differences there were very similar values, in this case, a love of the Texas ranching tradition and a love of Texas horses.

It is our belief that if you decide to have a trail ride on your ranch, you will have a similar discovery with the riders you meet.

# RANCHERS & Riders OF TEXAS



We have come together to offer Texans the opportunity to experience our wonderful ranches from the back of a horse.

## TASK FORCE MEMBERS

**Craig Brubaker – Task Force Chairman**

**Susan Breed – TETRA**

**Lonnie Bradshaw – TETRA**

**Matt Jauer – TFB and TSCRA**

**Ned Meister – TFB**

**Butch Davis – TSCRA**

**Doug Householder – TAEX**

**Scott Shafer – TAEX**

**Bruce Carpenter - TAEX**

**Judon Fambrough – Texas Real Estate Center**

## CONSIDERATIONS

When considering putting on a trail ride, there are a number of questions which need to be answered. By answering these questions, you will get a better idea of all that is involved in conducting a ride as well as decide how you specifically will design your ranch ride.

**RANCH:** These questions all relate to issues you need to consider concerning your ranch.

1. How many acres are available for trail riding (minimum of 1,000 for weekend ride)?
2. Are there existing trails or will trails need to be made or marked?
3. Is there a campsite that is fairly easily accessible and level?
4. Can the campsite be used if it rains?
5. How many campers will the campsite hold?
6. Will toilet facilities be made available to riders?
7. Is there water available for humans and horses?
8. Are there electrical hook-ups available to campers?
9. Is the access road cleared and graded flat enough so that smaller vehicles won't be "high centered" or larger vehicles (RV's) impeded by trees or brush?
10. How can horses be restrained overnight, i.e. tied to trees, existing pens or corrals, tied to trailers?
11. Will riders or horses be allowed to swim in tanks or rivers?
12. Should the campsite be shredded or mosquito sprayed for comfort ahead of time?
13. What times of year are most suitable and enjoyable for trail riding in your area?
14. Are wagons welcome/appropriate for the terrain?
15. Are there motels, entertainment or shops nearby?
16. Is lodging available on the property?
17. What unique qualities does the property have to offer, i.e. historic, wildlife, etc.?

18. What type of educational program could be provided, i.e. horsemanship, wildlife, historic, etc.?

**FOOD:** Many rides provide food. These are some issues to consider in making that decision for your ride.

1. Will any food be served?
2. Who will cook the food?
3. Who will serve the food?
4. What will the food cost you?
5. What will you charge for the meals?
6. Is it mandatory or may riders, “on a budget”, provide their own food and get a reduced rate?
7. Will beer and alcohol be allowed on the trails and/or in camp?
8. Are there trash receptacles available near the eating areas?
9. Will tables and chairs be provided?
10. Is there shade, i.e. trees, a tent awning, a shelter, available at the dining area?
11. Will cold drinks be provided at “pop breaks” along the trail?

**RIDE MANAGEMENT:** This is the most time consuming part of any ride. These considerations will help you start to get a picture of the amount of work involved.

1. Who will organize the ride? I.e. rancher, club representative, independent organizer?
2. When will the ride begin and end? (Most rides open Friday afternoon and close Sunday afternoon.)
3. Are signs posted to help riders find camp areas?
4. Will written ride rules be provided to each rider?
5. What horse papers will be required? (All riders must, at a minimum, provide Coggins papers.)
6. Who will provide final answers in case of disputes?
7. Who will be trail bosses and scouts?

8. Will fees be refunded if ride is cancelled due to rain?
9. Will everyone ride together or can people choose to ride unattended?
10. Is a ranch map available/necessary?
11. Will separate trail boss be provided for riders with faster gaited type horses?
12. Will certain areas of the ranch be off limits?
13. Who will restricted/hazardous areas be marked?
14. Who will collect many and signed releases?
15. Who will prepare and serve food?
16. Who will be parking director?
17. Who will check horse papers?
18. Who will be on site clean-up crew?
19. Will dogs be allowed?
20. How many riders and/or wagons can be handled on the ride?
21. What local resources are available?
  - Locations and phone numbers for:
    - Motels
    - Health services
    - Emergency services
    - Veterinary services
    - Cowboy minister
    - Unique visitor attractions
    - Gas stations, propane
22. Will there be quiet hours, i.e. 10:00 PM to 7:00 AM?
23. Will there be a special camping area for those who want to run generators?
24. Will lighting or electrical hookups be provided in any part of the camping area?
25. Will there be a special policy regarding studs?

**COSTS:** The pricing of any new service is a difficult question to answer. Based upon our demonstration rides, we developed these considerations.

1. How much will it cost to ride? (\$35 per horse, no meals; \$75 per rider, 6 meals)
2. Can children under a certain age participate for a reduced rate?
3. Will advance reservations/deposits be required?
4. What is the policy on refunds after a certain date?
5. What is the policy on refunds if weather forces cancellation?
6. Will riders be permitted to participate on a daily basis or must they pay for the entire period? If daily, how will you know who has paid for today/all, i.e. badges, hospital bracelets, etc?
7. Will any part of the cost be donated to charity or to the specific horse rider organization?

**MARKETING:** Obviously, if you have decided to put on a ride, you need to let trail riders know about it. These recommendations outline an inexpensive marketing plan which will get you started.

1. Print an attractive flyer which will:
  - a. Describe the unique qualities of the ranch and any unusual activities, i.e. river, beautiful views, singing, story telling.
  - b. Include a phone number to call if riders have questions. E-mail is also helpful, and cheap.
  - c. Answer all the basic questions, what, when, why, how much.
  - d. List all restrictions, i.e. dogs, alcohol, age limits.
2. Send the flyer to target markets.
  - a. Contact trail riding clubs to get mailing lists, i.e. TETRA, local riding clubs, sheriffs' posse.
  - b. Contact trail riding publications, i.e. Texas Trails, Trail Riders Journal, Trail Riders Magazine (this is generally free).
  - c. Post flyer at local feed stores, co-ops, extension offices.
3. Contact all local publications, i.e. newspapers, horse newsletters, and ask them if they will list your ride and if they would like to do an article.
4. Conduct all marketing at least one month in advance, earlier if possible.



## LIABILITY ISSUES

The popularity of equine activities and events has reached an all-time high in Texas.

With any activity, equine related or not, comes associated risks and liabilities. Participants face the risk of personal injuries from animals, other participants as well as -premise defects. Merchants face possible liability from equipment failure as well as their rented animals injuring participants and spectators. Finally, sponsors and landowners furnishing the facilities and land for the events, face potential liability for harm to participants and spectators injured by animals, premise defects, to name a few.

If Texas legislators had not passed laws protecting merchants, sponsors and landowners, the popularity of equine activities may not have risen to its current level in this state. This section presents a brief overview of the case law and statutory law regarding the associated risks and liabilities.

### **Participants Injuring Participants**

As to the issue of participants injuring other participants at an equine event, only recently has Texas appellate cases addressed the topic. The first case involved golf, the second softball and the third barrel racing. In each case, the courts held that any person who voluntarily agrees to participate in the sporting event waives their right to sue for any foreseeable injury they incur. No Texas statutes address the issue, only case law.

### **Merchants' Liability**

Texas statutes do address the issue of merchants' liability for equipment failure and rented animal injuring participants. In 1995, Texas legislators enacted Chapter 87 of the Texas Civil Practices and Remedies Code. The statute encourages equine activities by limiting the liability of those who sponsor or permit equine events.

More precisely, the statute provided that "any person, including an equine sponsor or an *equine professional*, is not liable for property damage or damages arising from the personal injury or death of a participant if the property damage, injury or death results from the dangers or conditions that are inherent risk of equine activity."

The statute is chock full of definitions of the key words and terms. Without belaboring each, please refer to the article entitled "Statutory Limitations for Equine Activities" attached at the end of this paper. Of interest, though, note that "equine animals" includes horses, ponies, donkeys and hinnies.

The statute defines an "equine professional" as a person, who for compensation:

- instructs a participant or rents to a participant an equine animal for the purpose of riding, driving or being a passenger on the equine animal or
- rents equipment or tack to a participant.

The limited liability is not automatic, though. The equine professional must clearly and visibly post and maintain prescribed warning signs on or near stables, corrals or arenas that they manage or control. The same warning must be written clearly into every contract in which the professionals enter with participants for professional services; instructions; or rental of equipment, tack or an equine animal regardless of where the equine activity occurs.

The warning must read as follows:

### **Warning**

**Under Texas law (Chapter 87, Civil Practice and Remedies Code), an equine professional is not liable for an injury to or the death of a participant in equine activities resulting from the inherent risks of equine activities.**

*(These signs are available at your local Farm Bureau office.)*

However, merchants and instructors are not protected if they provide equipment or tack that they know or should have known was faulty or did not determine a participant's ability to safely manage an animal.

### **Sponsors' Liability**

Sponsors of equine events also receive the statutory protection, but without the need of posting the required warning just described. The statute defines "equine activity sponsors" as:

- a person or group who sponsors, organizes or provides the facilities for an equine activity, including equine facilities for a pony club, 4-H club, hunt club, riding club, therapeutic riding program, high school or college class, program or activity without regard to whether the person operates for profit or
- an operator of, instructor at, or promoter for equine facilities, including a stable, clubhouse, pony ride string, fair or arena where an equine activity is held.

There are exceptions to coverage for sponsors. The statute requires sponsors (and landowners) to post warning signs or to provide written or

verbal warnings of known dangerous latent conditions of the land they own, lease or control.

### **Liability to Spectators**

Chapter 87 does not cover any injury, harm or death to a spectator at an equine activity or event. The only exception is when the spectator is in an unauthorized area in the immediate proximity to the equine activity. For this reason, either or both waivers and liability insurance, discussed later, may need to be used for protection.

### **Landowners' Liability**

The last person in the chain of liability is the landowner. The term "landowner" or "property owner" is not mentioned in Chapter 87 while the definition of a sponsor includes the person or group who **provides the facilities** for an equine activity. The definition of sponsors also includes **an operator** of a stable, clubhouse, pony ride string, fair or arena. The word ("owner" is non-existent.

Obviously, the landowner receives limited, but not blanket protection from "certain land conditions and hazards, including surface and subsurface conditions." However, the statute never mentions which of the *certain* conditions are covered. Likewise, the list of activities not covered by the statute include dangerous latent conditions of the land if known and not disclosed by the person who owned, leased or otherwise controlled the property. Evidently, the *certain* conditions covered are those dangerous conditions *unknown* to the landowner, operator or sponsor.

Landowners allowing or sponsoring equine events may wish to look to another statute, Chapter 75 of the Texas Civil Practices and Remedies Code, for supplemental protection. The only problem with Chapter 75 is that equine activities are not explicitly mentioned.

### **Landowners' Common Law Duty**

To understand the importance of Chapter 75, landowners must grasp their common law duty to persons on their property.

A landowner's liability (or responsibility) for the safety of anyone on the property depends on the legal classification of the person at the time of injury. There are four categories: an *invitee*, a *licensee*, a *trespasser* and a *child under the attractive nuisance doctrine*. Theoretically, participants and spectators could fit in any one of these.

Fee-paying participants and spectators at equine events are classified as invitees. Landowners have a legal duty to keep the premises safe for the invitee's protection. To accomplish this the landowner must give adequate

and timely notice of concealed or latent perils (dangerous conditions) that are personally known or that a reasonable inspection would reveal. Injuries caused by dangerous conditions that are apparent or that could be revealed by reasonable inspection are the landowner's responsibility, but comparative negligence lessens the liability to the extent invitees contribute to their own injuries for failing to be on the lookout.

Nonpaying participants and spectators with permission to enter are classified as licensees. Landowners have 'a legal duty to warn them of known dangerous conditions or to make the conditions reasonably safe.

This requirement parallels the requirement under Chapter 87 where notice of known dangerous latent defects must be disclosed. No inspection is required. Again, comparative negligence lessens the liability to the extent licensees contribute to their own injuries for failing to be on the lookout.

Participants and spectators who enter without permission are classified as trespassers. The landowner owes them no legal duty. The law prohibits the landowner from willfully or wantonly injuring them except in self-defense or when protecting property. The landowner is liable for gross negligence or for acts done with malicious intent or in bad faith.

Trespassing children are protected by the attractive nuisance doctrine. An attractive nuisance exists when: the trespassing child is not accompanied by an adult; the child is too young to appreciate or realize a dangerous condition; the location of the dangerous condition is one that the landowner knew or should have known children frequent; and the utility of maintaining the condition is slight compared to the probability of injury to children. The landowner may avoid liability if any one of these conditions is missing.

### **Recreational Guests (Chapter 75)**

To encourage landowners to allow recreational guests on their property, Texas legislators enacted Chapter 75 of the Texas Civil Practices and Remedies Code. The statute reduces a qualifying landowner's duty of care to recreational guests, whether invitees or licensees, to that of a trespasser.

The primary problem faced by landowners for equine activities is the statutory definition of recreational guests. It does not specifically mention equine activities and events nor address the status of spectators at recreational events.

Section 75.001 (3) defines the term "recreational purposes" to include hunting, fishing, swimming, boating, camping, picnicking, hiking, pleasure driving, nature study (including bird-watching), cave exploration, water- skiing and other water sports, or any other activity associated with enjoying nature or the outdoors. In all probability, certain, if not all, equine activities

would fall under any *other activity associated with enjoying nature or the outdoors*. But, it does not explicitly say so.

To qualify, the place where the recreational activity (equine event) occurs must be on agricultural land. This means any land located in this state suitable for use in production of-

- plants and fruits grown for human or animal consumption or for . fibers, floriculture, viticulture, horticulture or seeds,
- forests and trees for lumber, fiber or other items used for industrial, commercial or personal consumption or
- domestic or native farm or ranch animals kept for use or profit.

As long as the participants enter for recreational purposes on agricultural land, and as long as the landowner's total charges during the previous calendar year for all entries do not exceed four times the total amount of ad valorem taxes imposed on the land during the same period, the landowner owes the recreational guests no greater duty than that of a trespasser. Furthermore, the landowner is not responsible for any injury to a person or property caused by the recreational guest while on the property.

If the fee limit is exceeded, the landowner owes all recreational guests the common-law duty owed an invitee or licensee with one exception. The trespassory degree of care is preserved if the landowner on agricultural land has minimum amounts of liability insurance coverage. These amounts are \$500,000 for each person, \$1 million for each single occurrence of bodily injury or death and \$1 00,000 for each single occurrence for injury to or destruction of property.

Landowners achieve two advantages by having the minimum amounts of liability insurance. First, the trespassory degree of care continues to participants when charges exceed four times the amount of the ad valorem taxes. Second the stipulated amounts of liability coverage serve to cap the landowner's liability if sued for an act or omission relating to the premises. (*Seepage 1 5*)

If the fee limit is exceeded without the minimum liability coverage in effect, then the landowner faces the degree of care owed to either an invitee or licensee, whichever the case may be. The amount charged has no effect on the attractive nuisance doctrine.

### **Landowners' Options for Limiting Liability**

What, then, are landowners' alternatives for limiting liability? **First**, to avail themselves of the benefits of Chapter 75, landowners may charge no more than four times the amount of ad valorem taxes imposed on the agricultural land or twice the amount of ad valorem taxes on non-agricultural

land. (*Seepage 15.*) This may not be a viable option for large-scale operations or where agricultural-use or open space valuation is taken.

Landowners who charge more than four times the amount of the ad valorem taxes may purchase liability insurance according to the specified minimum amounts depending on whether the activity is conducted on agricultural or non-agricultural land.

**Second**, to -take advantage of any benefits under Chapter 87, landowners and sponsors may post the appropriate warning on their property and include the same warning in all their contracts. Arguable, this warning protects merchants only but is important if the landowner or sponsors rent animals or equipment to participants. Also, landowners must still warn all participants verbally, in writing or by signs of known dangerous latent conditions of the land under Chapter 87.

**Third**, the landowner can do as the law dictates: inspect the property routinely and either warn the participants and spectators of the dangerous conditions or make the conditions safe. This may be difficult because conditions change rapidly. Notifying all participants and spectators of a dangerous condition may prove impossible.

**Fourth**, the landowner may require the participants or sponsors to purchase and assign a liability insurance policy to the landowner covering the landowner's liability to the participants and possibly spectators. The minimum coverage should equal or exceed the limits mentioned earlier. However, the premiums may cause the entry price to become prohibitive, especially on non-agricultural land where no amount of liability insurance caps the landowner's or sponsor's liability. (*Seepage 15.*)

**Fifth**, the landowner and sponsors may secure waivers from the participants and possibly spectators, releasing the landowner and sponsors from liability. A waiver is defined as the intentional relinquishment of a known right. To be effective, the release provision must meet certain standards.

For instance, the agreement must be based on an offer and acceptance between parties who have equal bargaining power. For this reason, a recent Texas appellate court ruled that parents cannot release, in advance, a minor's right to recover for personal injuries caused by the negligence of another (*Munoz v. IHaz Inc. d/b/a Physical Whimsical*, 863 S. W. 2d 207 [1993]).

The agreement for the release must be based on consideration, but it need not be monetary. The agreement in exchange for the right to participate or view an equine activity or event may be sufficient.

The Texas Supreme Court has added three more requirements for an effective waiver agreement. First, the provision must state that the participant or spectator indemnities (releases) the landowner and/or sponsor

from any acts arising "from the landowner's or sponsor's negligence." This is sometimes referred to as the Express Negligence Doctrine (*Ethyl Corp. v. Daniel Const. Co.*, 725 S. W. 2d 705 [Tx. S. Ct. 1987]).

Second, the written contract must give the participants or spectators fair notice of the release provision. The fair-notice principle focuses on the appearance and placement of the provision, not its content. However, the fair-notice requirement is -not necessary if the landowner or sponsor can prove the participant or spectator had actual notice or knowledge of the provision (*Spense & Howe Constr. Co. v. Gu@'Oil Corp.*, 365 S. W. 2d 631 [Tx. S. Ct., 1963]).

Third, the release provisions must be conspicuous. The element of conspicuousness" is tied to the previous "fair-notice" requirement. Basically, the release provision must be conspicuous enough to give the participants or spectators fair notice of its existence (*Dresser Industries, Inc. v. Page Petroleum, Inc.*, 853 S. W. 2d 505 [Tx. S. Ct. 1993]).

How "conspicuous" is conspicuous? No absolute answer can be given. However, the following suggestions may be useful.

- Make the written provision noticeable.
- Emphasize the entire paragraph - not just a portion. Better still, place the waiver at the end of the contract on a separate sheet of paper.
- Use headings but not misleading ones. Italicize the headings.
- Ask the participants and spectators to initial the waiver provisions of the contract or sign the page if placed on a separate sheet.

For some protection from the attractive nuisance doctrine, the landowner or sponsors agreement may require all children to be accompanied by an adult at all times.

If the waiver form is used, it may meet the requirement under Chapter 87 of providing written notice of known dangerous latent conditions of the land. Consequently, the form could serve two functions.

A waiver form for hunters was presented by the late Dan Patton, an attorney with Morrill, Patton and Bauer in Beeville, Texas, at the 13'h Advanced Real Estate Law Course sponsored by the Texas State Bar in 199 1. The form has been tailored to equine activities and events and is included at the end of this paper. The form is not endorsed by Mr. Patton, the speaker, sponsors of this seminar, the Texas Real Estate Center or Texas A&M.

This section was written by Judon Fambrough, Senior Lecturer, Attorney at Law, Texas Real Estate Center, Texas A&M University.

## **CATEGORIES OF LAND AND LIMITED LIABILITY UNDER CHAPTER 75**

Chapter 75 divides land and liability into three categories. It is important to understand each category with equine activities or events because the property on which the event occurs may or may not be agricultural land and equine activities and events may or may not be classified as recreational purposes.

The broadest protection is given to agricultural land used for recreational purposes. Landowners, lessees and occupants owe invitees and licensees no greater duty than owed trespassers until total charges exceed four times the ad valorem (property) taxes. Then, the minimum amounts of liability insurance are needed to cap liability and to preserve the trespassory degree of care.

Limited protection is give to non-agricultural land used for recreational purposes. (This category could include stables, arenas, etc.) Landowners, lessees and occupants owe invitees (not licensees) no greater care than owed trespassers until the total charges exceeds twice the amount of ad valorem (property) taxes. Then, no amount of liability insurance will cap the landowner's, lessee's or occupant's liability nor preserve the trespassory degree of care.

Finally, maximum liability coverage is extended to agricultural land used for non-recreational purposes as long as \$1 million liability insurance is in place for each single occurrence of bodily injury or property damage.

Obviously, all landowners, sponsors, lessees and occupants would like for all equine activities and events to be classified as a "recreational use" on agricultural land to ensure coverage under Chapter 75.

It is unclear whether viewing a recreational event as a spectator makes the spectator a recreational guest under Chapter 75. Arguments can be made either way. No Texas appellate cases address the question.



A Reprint from *Tierra Grande*, the Real Estate Center journal

# Statutory Limitations for Equine Activities

By Judon Fambrough

Effective September 1, 1995, the Texas Legislature enacted a new statute that encourages equine activities by limiting the liability of those who sponsor or permit such events as parades, trail drives or shows. More precisely, the statute provides that "any person, including an *equine sponsor* or an *equine professional*, is not liable for property damage or damages arising from the personal injury or death of a *participant* if the property damage, injury, or death result from the dangers or conditions that are an *inherent risk of equine activity*. . ." (Chapter 87 of the Texas Civil Practices and Remedies Code). The statute lists *inherent risks* as:

- the animal's tendency to behave in ways that cause personal injury or death;
- the animal's unpredictable reaction to sound, sudden movement or unfamiliar object, person or other animal;
- certain land conditions and hazards, including surface and subsurface conditions;
- collision with another animal or object; or
- a participant's negligent actions that cause injury to themselves or others when they fail to control the animal or to act within their ability.

Definitions-which comprise half of the statute-are critical for understanding the new law. For instance, the term *equine animal* includes a horse, pony, mule, donkey or hinny.

An *equine activity* includes:

- an equine animal show, fair, competition, performance or parade that involves any breed of equine animal and any equine discipline, including dressage, hunter and jumper horse shows, grande prix jumping, three-day events, combined training, driving, pulling, cutting, polo, steeple chasing, English and Western performance riding, endurance trail riding, Western games and hunting;
- equine training or teaching activities;
- boarding equine animals;
- riding, inspecting or evaluating an equine animal belonging to another, whether or not with compensation to the owner;
- informal equine activity, including a ride, trip or hunt that is sponsored by an equine activity sponsor;
- permitting a prospective purchaser of the equine animal to ride, inspect or evaluate the equine animal;
- sponsoring an informal equine activity, including a ride, trip or hunt;
- placing or replacing horseshoes on an equine animal; or
- rodeos and single-event competitions, including team roping, calf roping and single steer roping & whether or not the participants are compensated.

An *equine activity sponsor* means:

- a person or group who sponsors, organizes or provides the facilities for an equine activity,

including equine facilities for a pony club, 4-H club, hunt club, riding club, therapeutic riding program, high school or college class program or activity without regard to whether the person operates for profit or

- an operator of, instructor at, or promoter for equine facilities, including a stable, clubhouse, pony ride string, fair or arena where an equine activity is held.

An *equine professional* means a person who for compensation:

- instructs a participant or rents to a participant an equine animal for the purpose of riding, driving or being a passenger on the equine animal or
- rents equipment or tack to a participant.

A *participant* means a person who *engages in an equine activity* regardless of whether the person is an amateur or professional or whether the person pays for the activity or participates in the activity for free.

*Engages in an equine activity* means riding, handling, training, driving, assisting in the medical treatment of, being a passenger on or assisting a participant or sponsor with an equine animal. The term includes management of a show involving equine animals. The term does not include being a spectator at an equine activity unless the spectator is in an unauthorized area and in immediate proximity to the equine activity.

Certain exceptions and limitations apply. Liability for property damage continues when it arises from a participant's personal injury or death when the person, sponsor or professional:

- provided faulty equipment or tack to the participant, and they knew or should have known it was faulty;
- did not determine the participant's abilities to safely manage an equine animal before providing one;
- did not post warning signs or provide written notices or verbal warnings of dangerous latent conditions of the land if they knew of the conditions and they owned, leased or otherwise controlled the property;
- injured a participant by an act or omission with willful or wanton disregard for the participant's safety; or
- intentionally injured or killed someone.

Finally, equine professionals who want to claim the statutory limitations must clearly and visibly post and maintain prescribed warning signs on or near stables, corrals or arenas that they manage or control. The same warning must be written clearly into every contract the professionals enter with participants for professional services, instructions or rental of equipment, tack or an equine animal regardless of where the equine activity occurs.

The warning must read as follows:

### Warning

**Under Texas law (Chapter 87, Civil Practice and Remedies Code), an equine professional is not liable for an injury to or the death of a participant in equine activities resulting from the inherent risks of equine activities.**

*Fambrough is an attorney, member of the State Bar of Texas and senior lecturer with the Real Estate Center at Texas A&M University.*

# Sample

## RELEASE OF LIABILITY AND ACKNOWLEDGMENT AND ACCEPTANCE OF DANGERS, RISKS AND HAZARDS OF EQUINE ACTIVITIES AND EVENTS

I, the undersigned participant, hereby acknowledge that I have knowingly and willingly entered an Agreement, or become a party bound by the terms and conditions of an Agreement for an equine activity or event by and between the Sponsors and Landowners, namely \_\_\_\_\_ and \_\_\_\_\_, dated \_\_\_\_\_, 19\_\_\_\_. I understand the terms, provisions and conditions of the Agreement for the equine activity or event, its warnings and agree to abide by its terms, provisions and conditions.

I further acknowledge and understand that no warranty, either express or implied, is made by the Sponsors or Landowners as to the condition of the property or the facilities where the activity or event is to be held (hereinafter the premises) located in \_\_\_\_\_ County, Texas, or of any roads, trails, buildings, gates, fences, pens or other facilities or improvements located thereon. This document serves to warn me that dangerous conditions, risks and hazards do exist. My presence and activities on the premises expose both me and my property to dangerous conditions, risks and hazards, including but not limited to: poisonous snakes, insects, spiders, buildings, barns, arenas and other improvements, whether or not owned or erected by Sponsors or Landowners; erosion and general condition of the land, both on and off road roadways or senders, creating rough, hazardous and dangerous driving, riding and walking conditions; animals, both wild and domestic that may be diseased and/or potentially dangerous; deep water, and the use of vehicles. I hereby state that I am aware of these facts and expressly assume all such dangers, risks and hazards associated with them and agree to hold the Sponsors and Landowners harmless from these conditions whether or not caused by the Sponsors' or Landowners' negligence.

In consideration for the right to enter the premises, and to participate in the equine activity or event, I hereby release and agree to protect, indemnify and hold harmless the Sponsors, Landowners and their respective assignees, heirs, agents, employees and contractors from and against any and all claims, demands, causes of action and damages, including attorneys' fees, resulting from any accident, incident or occurrence arising out of, incidental to or in any way resulting from the use of the premises and any improvements located thereon, whether or not caused by the Sponsors' or Landowners' negligence. This release applies during the time that I am permitted on the premises. I hereby further covenant and agree that my heirs, successors, assigns and I will not make any claim or institute any suit or action at law or in equity against the Sponsors, Landowners or their respective assignees, heirs, agents, representatives, employees, successors or contractors by reason of conditions of the premises or activities occurring thereon, whether or not caused by the Sponsors' or Landowners' negligence.

As used in this release, the terms *I, my person and myself* include minors in my care while on the premises. I agree to accompany my minor children at all times while on the premises to prevent and avoid any possible imposition of the Attractive Nuisance Doctrine against the Sponsors or Landowners.

Dated and signed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_.

\_\_\_\_\_  
(Participant's Signature)

\_\_\_\_\_  
(Participant's Printed Name)

Participant's Address: \_\_\_\_\_  
\_\_\_\_\_

The late Dean Patton, an attorney with Morrill, Patton and Bauer in Beeville, Texas, presented this waiver form at the 13th Advanced Real Estate Course sponsored by the Texas State Bar in 1991. It has been edited by the Real Estate Center at Texas A&M University and tailored to equine activities and events. It is offered as a sample only.

## SURVEY FINDINGS

At each of the ranch rides, the riders were asked to fill out a questionnaire. The following summarized these results.

The average rider:

- has been trail riding for 13 years
- attends 12 trail rides a year
- drives 200 miles to participate in trail rides
- spends 2 nights away from home per ride
- owns 3 or fewer horses
- classifies themselves as an "intermediate" rider
- is 50 years old
- has graduated from high school and taken some college classes

When asked what would make a good ranch to ride on, these were the most frequent responses:

- Scenery and views
- Water crossings
- Challenging/varied/hilly trails
- Safety

When asked what would make a good trail ride, these were the most frequent responses:

- Good food
- Access to water for horses in camp area and on trail
- Rest room facilities
- Water and electrical hookups
- Evening entertainment, i.e. bonfire, singing, dancing
- Good parking and setup areas

# HELPFUL CONTACTS

## ASSOCIATIONS

### T.E.T.R.A.

Lisa Bowers, President  
10927 FM 1565  
Terrill, Texas 75160  
972-524-4203  
*lisabowers@usa.net*

### Texas Farm Bureau

P.O. Box 2689  
Waco, Texas 76702-2689  
254-751-2457

### Texas Southwest Cattle Raisers' Association

1301 W. 7TH  
Ft. Worth, Texas 76102-9934  
817-332-7064

### Texas A&M University System

Extension Horse Specialist Office  
Department of Animal Science  
2471 TAMU  
College Station, Texas 77843-2471  
409-845-1562

## MEDIA

### Texas Trailriding Homepage

*www.texasailriding.com*

### Texas Trails

791 Speegle Road  
Waco, Texas 78712  
254-848-4656  
*txtrails@mail.hot.net*

### Texas Trailriders Journal

3400 Mesa Court  
Flower Mound, Texas  
817-491-1554  
*TxTrlTdr@aoLcom*

### Trail Rider Magazine

P.O. Box 5089  
Alexandria, Louisiana 71307  
318-448-2234  
*trailmag@centuryinter.net*  
*www.trailridermagazine.com*

## CONCLUDING THOUGHTS

If you have reached this point of the handbook and your interest is aroused, you should consider joining TETRA as a ranch family member. The \$20.00 you spend will be well worth it. Through their newsletter, you will start to get to know more about trail riding. You will also learn about trail riding opportunities in your area. It is very important that you go on or visit a trail ride before you ever decide to put one on yourself.

Ranch-based trail riding is not for every rancher. It is an activity which can take a lot of time and involves you with a lot of people. If you enjoy having friends visit your ranch and would like to expand that idea to a money making venture, trail riding might be for you.

An initial low-cost way to test the waters is to ask some of the local TETRA members if they would like to come to your ranch for a ride. Guide the riders through your ranch for a couple of hours and then sit down for some honest conversation and iced tea.

An agricultural enterprise fits every ranch. It is only through careful consideration that successful mix of business activities can be created. We hope this handbook has helped you to evaluate trail riding as an alternative income source.

## **EXAMPLES**

**RANCH DESCRIPTION**

**RANCH MAP**

**FLYER**

**RELEASE FORM**

**RIDE RULES**

# 33 RANCH

KENEDY, TEXAS

**RIDE THE BANKS, BLUFFS AND HILLS OF THE SAN ANTONIO RIVER VALLEY**

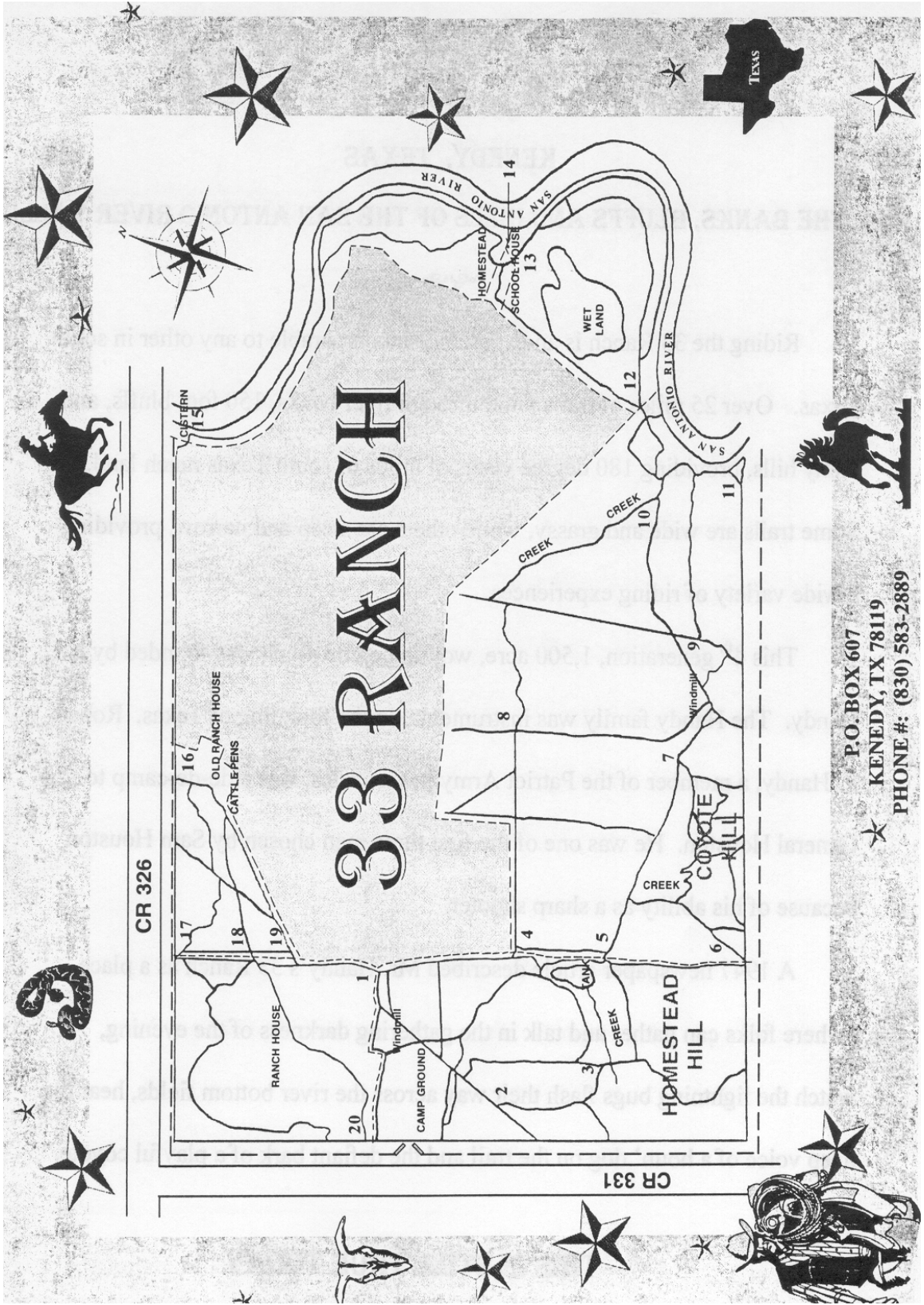


Riding the 33 Ranch is an experience incomparable to any other in south Texas. Over 25 miles of trails wind through river banks, 150 foot bluffs, and many hills, providing 180 degree vistas of miles of south Texas ranch land. Some trails are wide and grassy, while others are steep and narrow, providing a wide variety of riding experiences.

This 4<sup>th</sup> generation, 1,500 acre, working cattle ranch was founded by K.L. Handy. The Handy family was instrumental in the founding of Texas. Robert E. Handy, a member of the Patriot Army in Gonzales, was aide-de-camp to General Houston. He was one of the first three men chosen by Sam Houston because of his ability as a sharp shooter.

A 1947 newspaper article described Mr. Handy's 33 Ranch as a place "where folks can gather and talk in the gathering darkness of the evening, watch the lightning bugs flash their way across the river bottom fields, hear the deep voice of a houn' dog on the trail and the defiant bark of a playful coyote."

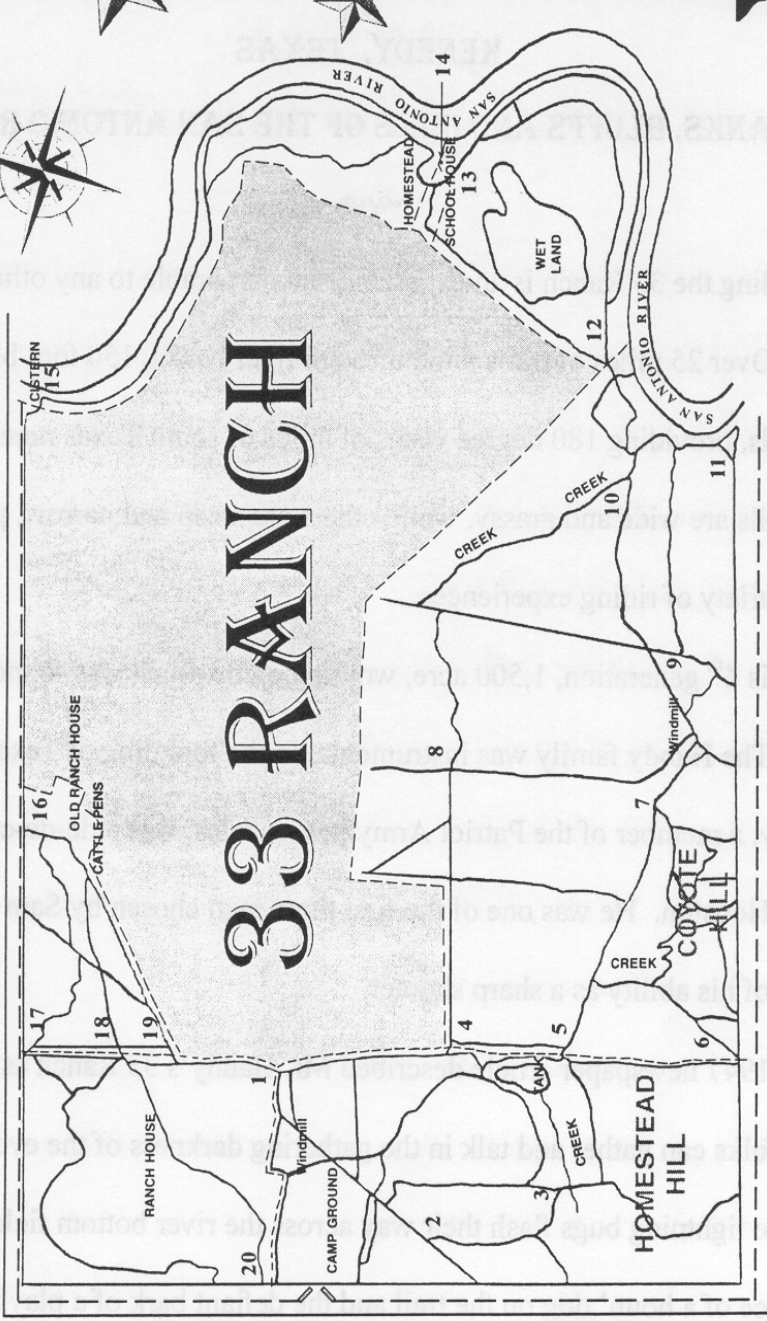
**THIS IS STILL TRUE TODAY**



CR 326

CR 331

# 33 RANCH

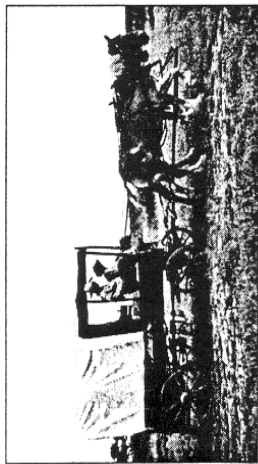


P.O. BOX 607  
 KENEDY, TX 78119  
 PHONE #: (830) 583-2889



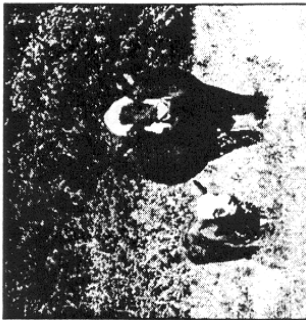
# The Real River Walk

The working farm and cattle ranch east of Kenedy, TX to the west banks of the San Antonio River, since the early 1880's has been 33 RANCH. In 1936, during the Great Depression, K.L. Handy purchased the part of this ranch known as the 33 RANCH river farm. The ranch today is still run by Mr. Handy's granddaughter raising cattle, horses, and some crops.



Come ride the banks, bluffs and hills of the San Antonio River Valley, an experience uncomparable to any other in South Texas. Over 25 miles of trails wind through river banks, 150 foot bluffs, and many hills, providing 180 degree vistas of miles of South Texas ranch land.

On Saturday, TSCRA staff will provide all interested riders with training regarding their Horse Identification Program (H.I.P.), including freeze branding and safety demonstrations. Riders will also have the opportunity to participate in a Stock Horse of Texas (S.H.O.T.) horsemanship clinic.



If you want to ride on a South Texas Cattle Ranch, have family fun, and go home a better and safer horseman don't miss this ride.  
For more information & reservations, call:

**33 RANCH**  
**830-583-2889**

## Ride Schedule

**Friday** ..... Check-in  
6:00 ..... Supper

**Saturday**

6:30 ..... Cattle Call  
6:30 - 7:30 ..... Breakfast  
8:30 ..... Ride Out  
12:00 - 1:30 ..... Lunch  
1:00 - 5:00 ..... TSCRA (H.I.P)  
1:00 - 5:00 ..... S.H.O.T Clinic  
1:30 ..... Ride Out  
6:00 - 7:30 ..... Supper  
7:30 ..... Camp Fire/Entertainment



### Sunday

6:30 ..... Cattle Call  
6:30 - 7:30 ..... Breakfast  
8:30 ..... Cowboy Church  
& Ride Out  
12:00 - 1:30 ..... Lunch  
Have a safe trip home.  
Hope you had a great time.

## Costs

(Including 6 meals) \$55  
Children 7 - 12 \$40  
Children 6 and under \$15  
S.H.O.T Clinic - \$10

**LIMIT 100 RIDERS**

# 33 RANCH

## RELEASE OF LIABILITY AND ACKNOWLEDGMENT AND ACCEPTANCE OF DANGERS, RISKS AND HAZARDS OF TRAIL RIDING ON THE PREMISES

I, the Rider and undersigned, hereby acknowledge that I have knowingly and willingly entered a Trail Riding Agreement, or become a party bound by the terms and conditions of the Trail Riding Agreement by and between the Rancher and Sponsor, 33 Ranch,, and \_\_\_\_\_, dated \_\_\_\_\_. I understand the terms, provisions and conditions of Trail Riding Agreement, its warnings and agree to abide by its terms, provisions and conditions.

I further acknowledge and understand that no warranty, either express or implied, is made by the Sponsors as to the condition of the property (hereinafter the leased premises) located in Karnes County, Texas, or of any roads, trails, buildings, gates or other improvements located thereon. This document serves to warn me that dangerous conditions, risks and hazards do exist. My presence and activities on the leased premises expose both me and my property to dangerous conditions, risks and hazards, including but not limited to poisonous snakes, insects and spiders; buildings, barns and improvements, whether or not erected by Sponsors; erosion and general condition of the land, both on and off roadways or senderos; creating rough, hazardous and dangerous driving, riding and walking conditions; animals both wild and domestic that may be diseased an/or potentially dangerous; deep water; and the use of vehicles. I hereby state that I am aware of these facts and expressly assume all such dangers, risks and hazards associated with them and agree to hold the Sponsors harmless from these conditions whether or not caused by the Sponsors' negligence.

In consideration for the right to enter the leased premises, I hereby release and agree to protect, indemnify and hold harmless the Sponsors and his or her respective heirs, agents, employees and assigns from and against any and all claims, demands, causes or action and damages, including attorneys' fees, resulting from any accident, incident or occurrence arising out of, incidental to or in any way resulting from the use of the leased premises and any improvements located thereon, whether or not caused by the Sponsors' negligence. This release applies during the time that I am permitted on the leased premises. I hereby further covenant and agree that I, my heirs, successors and assigns will not make any claim or institute any suit or action at law or in equity against the Sponsors or his or her respective heirs, agents, representatives, employees, successors or assigns by reason of conditions of the leased premises or activities occurring thereon, whether or not caused by the Sponsors' negligence.

As used in this release, the terms, *I, my person* and *myself* include minors in my care while on the leased premises. I agree to accompany my minor children at all times while on the leased premises to prevent and avoid any possible imposition of the Attractive Nuisance Doctrine against the Sponsors.

Dated and signed this \_\_\_\_\_ day of \_\_\_\_\_, 1999.

\_\_\_\_\_  
Rider's Signature

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Mailing Address (if different from above) \_\_\_\_\_

E Mail Address \_\_\_\_\_

Home Phone \_\_\_\_\_ Work Phone \_\_\_\_\_

In the event of an emergency, contact the person listed below:

Name \_\_\_\_\_

Relationship \_\_\_\_\_ Phone \_\_\_\_\_

Name(s) of minor members of my family participating in the event:

\_\_\_\_\_ Relationship \_\_\_\_\_ D.O.B. \_\_\_\_\_

\_\_\_\_\_ Relationship \_\_\_\_\_ D.O.B. \_\_\_\_\_

TETRA  YES

Coggins \_\_\_\_\_

NO

# 33 RANCH

## SCHEDULE

### FRIDAY

NOON .....	Check-in
6:30 P.M. - 7:30 P.M. ....	Dinner
7:30 P.M. ....	Campfire
	<i>33 RANCH RADIO THEATRE</i>
8:00 P.M. ....	Wagon Rides

### SATURDAY

6:30 A.M. ....	Cattle Call
6:30 A.M. - 7:30 A.M. ....	Breakfast
8:15 A.M. ....	Safety Meeting
8:30 A.M. ....	Ride Out
12:00 (NOON) - 1:00 P.M. ....	Lunch
1:00 P.M. - 2:00 P.M. ....	TSCRA (H.I.P.)
2:00 P.M. - 2:30 P.M. ....	SHOT Demonstration
3:00 P.M. ....	Ride Out
6:00 P.M. - 7:00 P.M. ....	Supper
7:00 P.M. ....	Campfire
	<i>COWBOY STORYTELLER &amp; MUSIC</i>

### SUNDAY

6:30 A.M. ....	Cattle Call
6:30 A.M. - 7:30 A.M. ....	Breakfast
8:30 A.M. ....	Cowboy Church
	Ride Out
12:00 (NOON) - 1:00 P.M. ....	Lunch

HAVE A SAFE TRIP HOME.

## RULES

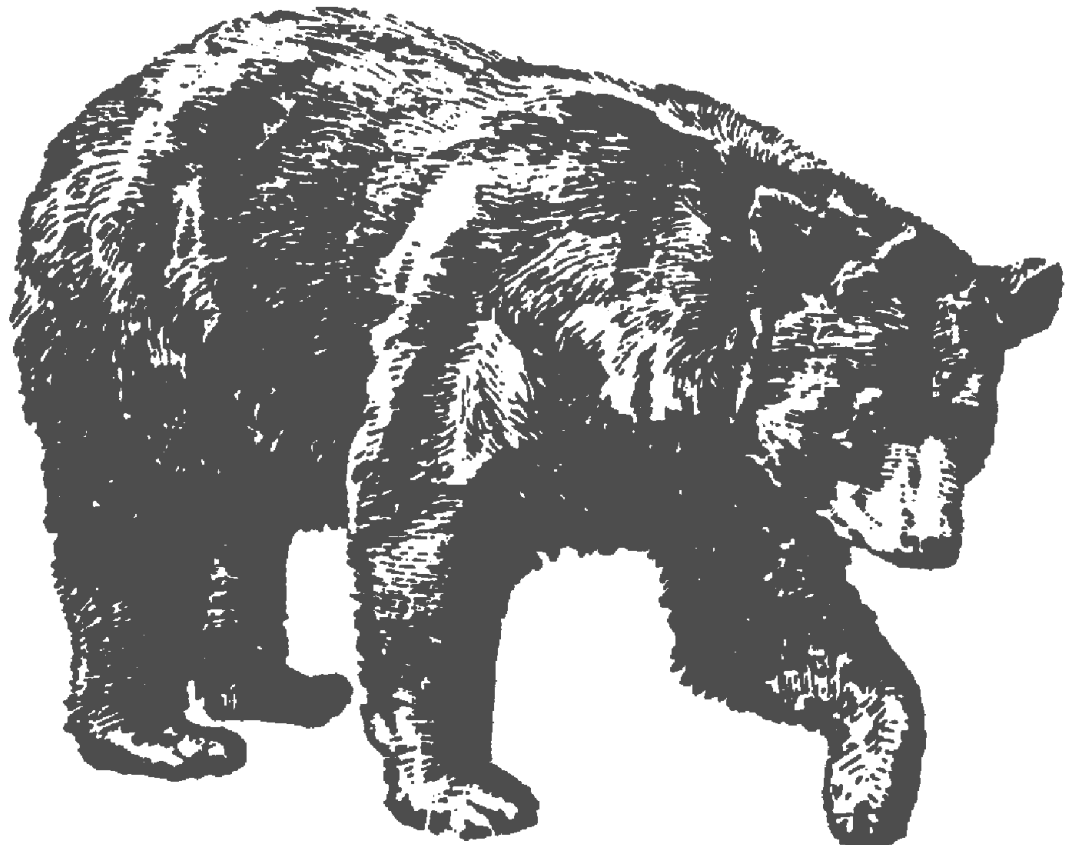
1. Practice good conduct and good manners
2. Respect the land and landowners request
3. Respect others
4. No Alcohol on trail
5. Zero tolerance for drunks or drugs
6. No disorderly conduct
7. Coggins paper will be checked on each animal in order to comply with all state and federal rules.
8. No dogs on trail
9. Kicking horses must have red ribbons
10. No unattended or uncontrollable horses will be allowed
11. Firearms are prohibited
12. Camp Area & Trails must be left clean
13. No playing of loud music
14. No swimming allowed
15. All riders must upon entering **33 Ranch**
  - present current coggins papers
  - read and sign liability form
  - pay fees

# Wildlife Management

Black Bear

"

# Ecology and Management of the Louisiana Black Bear





**For more information, in Mississippi contact:**

Department of Wildlife and Fisheries  
Mississippi State University Extension Service  
Box 9690  
Mississippi State, MS 39762  
Phone: (662) 325-3174  
E-mail: [wildlife@ext.msstate.edu](mailto:wildlife@ext.msstate.edu)

or

Mississippi Museum of Natural Science  
Department of Wildlife, Fisheries and Parks  
2148 Riverside Drive  
Jackson, MS 39202  
(601) 354-7303

# Ecology, and Management of the Louisiana Black Bear


**B**lack bears hold a prominent place in the history and folklore of people in the southeastern United States. During a bear hunting trip around Onward, Mississippi, in the early 1900s, President Theodore Roosevelt refused to shoot a bear that had been captured and tied to a tree. A journalist traveling with the hunting party penned the phrase “Teddy’s Bear.”

Black bears, once common in the Lower Mississippi River Valley (LMRV), have been reduced to an estimated population of fewer than 500. Since the turn of the twentieth century, bear habitat has been significantly reduced or eliminated throughout much of the LMRV region. Unrestricted and illegal harvests are among the reasons for their reductions.

Many people believe the downward trend in bear population numbers can be reversed, and they are working actively to restore the black bears. The Black Bear Conservation Committee, a broad-based coalition comprised of agencies, industry, academia, and landowners, is increasing awareness regarding challenges and needs presented by the plight of black bears in east Texas, southeast Arkansas, Louisiana, and Mississippi.

Attitudes of people in the LMRV will help determine the black bear’s future. If restoration is to be successful, it is because public and private sectors are working toward a common goal of balancing humans and black bears.

## History and Current Status

 The American black bear (*Ursus americanus*) was once found throughout North America from Alaska and Canada south to northern Mexico; currently 16 subspecies are recognized. Those animals found from east Texas through Louisiana and southern Mississippi are considered to be the Louisiana black bear (*Ursus americanus luteolus*). The bears in southeast Arkansas in the White River National Wildlife Refuge are genetically similar to the Louisiana black bear.

Historic references report bears in the LMRV reached peak abundance and were “widespread and common” in the bottomland hardwoods of the Mississippi and Atchafalaya drainages before settlement

by Europeans during the early 1800s. Bears were important to Native Americans, explorers, and settlers as a source of food, fur, and oil.

In Mississippi, a game survey in 1929 reported bears in northeast and north-central Mississippi and along the Pearl River. Statewide protection of bears was implemented in 1932, and at that time, fewer than 12 animals were believed to exist in Mississippi. Three pairs of bears were released in separate localities in 1934-35; this release was determined unsuccessful. In 1976, the last breeding population in the state was documented in Issaquena County. A statewide population inventory by the Mississippi Game and Fish Commission in 1978 reported bears as “uncommon” in 20 counties.

The Mississippi Museum of Natural Science collection includes 14 bears killed in Mississippi between 1972 and 1994. Mississippi Department of Wildlife, Fisheries and Parks estimates 25 to 50 bears are scattered in the Mississippi, Pearl, and Pascagoula drainages. Several bears are regularly sighted in the extreme southwestern part of the state, including Wilkinson County and along the Mississippi River from Rolling Fork to north of Greenville.

In Mississippi, legal hunting of black bears was closed in 1932. In 1974, the black bear was placed on the first list of rare and threatened vertebrates of Mississippi, and in 1984 was classified as endangered in Mississippi. The civil penalty for violating the State Endangered Species Law is \$1,000, or imprisonment for not more than 1 year, or both.

The Louisiana black bear (*luteolus*) was listed by the U.S. Fish and Wildlife Service in 1992 as federally threatened and, although bears in Arkansas north of the Louisiana/Arkansas border were excluded from this list, the historic range of *luteolus* includes southern Arkansas. The bear population in and around the White River National Wildlife Refuge is considered as “expanding and healthy.”

The decline of black bears in the LMRV region can be attributed to human disturbance, illegal kill, and habitat loss. The original 25 million acres of bottomland hardwoods in the LMRV region were reduced to 5 million by 1980. Because of the low reproductive



rate of black bears, the effect of illegal kill, especially of females, is a serious concern.

## Ecology

### Description

Black bears are black with a brown muzzle and occasionally will have a white blaze on the chest. Adult males weigh from 200 to 400 pounds, and adult females weigh from 120 to 200 pounds. Body lengths for both sexes vary from 3 to 6 feet from nose to tail.

Bears have good reasoning ability, long-term memory, dexterity and speed, tremendous strength, and are elusive. They are considered to be adaptable animals.

### Reproduction

Female black bears typically begin having cubs at the age of 3 to 5 years. Two-year-old bears may produce young where habitat quality and food resources are excellent. Females in poor-quality habitats may not produce young until 7 years of age, and food shortages during the previous year may decrease litter size.

Mating usually occurs during summer, with egg implantation delayed for about 5 months following mating. Cubs are born in winter dens in January and February. Twins are most common, but litter sizes may range from one to five. Cubs are helpless at birth, are about 8 inches long, and weigh from 8 to 12 ounces. The sex ratio at birth is usually 1 male to 1 female.

Cubs grow rapidly, and by the time the mother and cubs leave the den in April or May, the cubs weigh 4 to 8 pounds. Cubs stay with the mother for the first year and share a den the first winter following their birth. They emerge with the mother again in the spring and stay together until summer, when the family unit dissolves. During mild winters, the family unit may stay active through the winter. After the family unit dissolves, the female goes into estrus, breeds, and the cycle is repeated.

### Denning

Black bears are not true hibernators. They go through a winter dormancy period called carnivorean lethargy or torpor, which includes denning for periods of time during winter, at which time normal body metabolism changes dramatically. This torpor aids in survival during food shortages and severe winter weather conditions. The onset of denning in the Deep South is from late November to early January. Activity and movements decrease greatly during this period, and bears enter “predens” or “nests,” or may directly enter the den where they will spend the winter.

Bears do not eat, drink, urinate, or defecate during the denning sleep. Waste products are recycled as a result of unique metabolic and physiological processes. Most bears are easily aroused if disturbed while denning.

Denning activity is influenced by food availability, age, sex, reproductive condition, day length, and weather. Interruption of denning period or changes in den sites during the denning period may be caused by human disturbance, flooding, changing weather conditions, and poor concealment of ground dens.

Bears in the LMRV region are more active in winter months than are the bears found in more northern latitudes. Male bears, in particular, may be more active in winter; some males may bed for a few days or weeks in one area before moving to a new bedding site. Pregnant female bears usually prefer den sites that are secure and inaccessible, and when available, will select large, hollow trees that are dry, insulated, and secure.

### Movements

Monitoring bear movements reveals that bears are the most active from dusk through dawn, although daytime activity is not unusual. In forested cover, bears often use “daybeds,” which are usually shallow, unlined depressions scratched in the ground or leaves. Mothers with cubs often rest at the base of trees; if disturbed, she can send the cubs up the tree, then climb the tree with them, or leave the area alone. Bears also rest in the crown or lower branches of a tree.

Male bears often move two to eight times the distances that females move. Home ranges, or the land areas used annually or periodically, vary by year and season. Home-range size is influenced by sex, population density, age, food availability, and reproductive status. Male home ranges typically increase during the summer mating season, and in the fall, bears move more often when foraging heavily to build winter fat reserves.

Bear activity and movement center on meeting habitat needs (year-round) and finding mates (breeding season). Estimates of home-range sizes indicate adult males may use more than 40,000 acres, and adult females may use up to 18,000 acres. Older male bears exert social pressure on younger bears, particularly during the breeding season, forcing them to disperse to other areas.

Research indicates bears frequently use uncleared drains, ditches, bayous, and river banks when moving across open land from one forested area to another. These travel corridors are particularly important to adult and juvenile males that reside in a landscape composed of fragmented forestland and large agricul-

tural fields. Travel corridors of brush and trees as narrow as 50 yards across have been used by bears to pass through agricultural areas, but the wider the better.

Mobility of bears, particularly young, dispersing males, puts them at considerable risk. Conflict situations often result when bears enter unfamiliar territory and encounter humans. Bears have a homing instinct and will attempt to find a way back to familiar territory; therefore, relocation of nuisance bears is rarely successful. Bears have traveled up to 400 miles from relocation sites, and frequent road and highway crossings, coupled with contact with humans, increase stress and likelihood that bears will not survive relocation.

## Food Habits

Black bears are carnivores (meat eaters) but are not active predators of vertebrate animals. They are better characterized as opportunistic omnivores, because they eat almost anything available, including plant and animal matter. Considerable time is spent foraging for food. Feeding signs are usually found where bears are active and may include torn logs, clawed trees, and trampled food plants. Bears locate food by smell and feed at all levels of the forest, from climbing trees for acorns and berries to rooting up grubs in rotten logs on the forest floor.

After emerging from the den in the spring, bears may remain in a semifasting state for a short time. With the onset of feeding, succulent vegetation is first consumed, followed by residual hard mast such as acorns and pecans, agricultural crop leftovers, and insects. From late spring through summer, soft fruits such as berries, pokeweed, devil's walking stick, thistle, sassafras, palmetto, persimmons, and wild grapes are important food items. By fall, diets shift heavily to pecans and acorns, which are carbohydrate-rich food sources that build fat reserves necessary for denning. Bears exhibit the greatest weight gain during fall hard-mast consumption.

Agricultural crops are important foods year-round and are particularly important where habitat is fragmented and bear densities are high. Bears are attracted to crops such as corn, wheat, and sugarcane and often become attracted to human garbage and pet foods. Where bears are present, take measures that prevent access to these attractive foods.

# Habitat



## Requirements

The Louisiana black bear lives primarily in relatively large, contiguous areas of bottomland hardwood habitat. Habitats must provide escape cover, dispersal corridors, abundant and diverse natural foods, water, and denning sites. Black bears are adaptable habitat generalists, and well-managed, productive forests can provide good bear habitat. With the large home-range size needed, it is critical to have large expanses of suitable habitat.

Food items must be present in sufficient quantity and quality on a year-round basis. These foods generally include the following items:

- Grasses, thistles, and other annual weeds.
- Fruiting vines and shrubs.
- Hard mast such as acorns, agricultural crops, and forages.
- Insects, small invertebrates, and vertebrates found on the forest floor in rotting logs, slash, and snags.

High-quality escape cover is especially important for bears living in fragmented habitats and/or in close proximity to humans. Bears adapt and thrive if provided areas of retreat that ensure little chance of close contact with humans. Thick understory brush or cover found typically in diverse bottomland hardwoods with fairly open canopies and mature trees provide this natural cover. Timber harvest slash and the thick regrowth normally associated with harvest can enhance escape cover quality and provide additional feeding and denning habitats.

Providing a mix of small wildlife openings, interspersed with thick brush cover, mature mast-producing stands, with occasional denning trees and brush piles, meets most bear habitat needs. Travel corridors of timber connecting two separate forest areas may aid in bear movement and dispersal, and if located along drains (streamside management zones [SMZ's]), may help protect stream water quality and provide den trees.

Movement studies document that bears use heavy cover for daybeds and denning sites. Daybeds often are located in hardwood forests that have been logged within the previous 5 years. Brush pile and ground nests are most frequently used as dens by males, who prefer denning in areas with discarded logs and thick briar and vine growth.

# Management



Habitat management practices that benefit black bears also benefit other animals. Landowners and managers who want to enhance their lands for bears can incorporate the following guidelines into individual management strategies.

## • Natural bottomland hardwood forests

Large tracts of mature bottomland hardwood forests of mixed tree species normally provide good to excellent habitat for black bear, and often do not require intensive management to improve or maintain. Landowners can successfully integrate timber harvest with black bear habitat management and in many cases improve habitat conditions.

Stand diversity is greater if an uneven-aged management system is used, with single-tree selection, group selection, or small-patch harvest cuts as the harvest options available. Diverse age classes, stand types, and vegetative composition within the forest provide good habitat conditions for black bears.

Rotation length for crop trees should be a minimum of 50 years; 70 to 100 years may be preferred for hard-mast production. Stand thinnings, or intermediate cuts, should be performed on 5- to 15-year intervals. Design intermediate cuts to remove poor-quality trees, promote regeneration of desirable tree species, increase food production, or increase escape cover for bears. Avoid diameter-limit cuts because they often are detrimental to timber and bear management over the long term.

Concentrate on midstory timber stand improvement through herbicide injections to remove less desirable, noncommercial tree species and species that do not benefit bears. These include American hornbeam, box elder, and eastern hop hornbeam. Leave the bears' beneficial species such as mulberry, swamp dogwood, spicebush, and other fruiting species.

Natural regeneration of desirable hard-mast species such as oaks can be through silvicultural management operations. Group selection or small patch removals enhance regeneration of shade-intolerant oaks and increase early successional foods such as dewberry, blackberry, elderberry, and pokeberry.

## • Hardwood plantations

In hardwood plantations, schedule harvesting operations to create maximum diversity. Do not schedule harvest cuts on adjacent compartments or stands during the same time period. Maintain corridors as wide as possible between plantation fields, and manage the corridors by selective harvests that favor hard mast species and cavity trees. In intensive, short-rotation

plantations, use stump-sprout regeneration, where feasible, to allow regeneration within 1 year of harvest. Leaving clumps of larger standing trees in the harvested stand will increase use of these areas by sows.

## • Pine plantations and forests

Managers typically use even-aged management strategies to regenerate pine stands. Regeneration usually falls within two methods—those leaving two to three seed trees per acre for natural regeneration and harvest cuts, with some form of site preparation followed by planting pine. Make irregular-shaped harvest areas to promote edge habitat.

To create maximum diversity between stands, have at least 7 years' difference in age classes between two adjacent regeneration areas. This ensures a constant supply of soft mast within a relatively small area.

Thin even-aged pine stands as soon as economically feasible (12 to 15 years, depending on site quality). Thinning allows sunlight to reach the forest floor and promote the growth and production of soft mast and low brush. Fire helps maintain the pine ecosystem; burn on a 3- to 5-year rotation, depending on site quality. Planted pine stands may be burned as early as 7 to 10 years old and within 2 years following intermediate thinnings. Protect hardwood areas from fire.

In pine systems, leave hardwood-mast producers along the sides of streams. SMZ's should be wide and large enough to be separately manageable stands. When feasible, leave logging slash and tops for bedding areas; they are best left unburned. Snags and dead fall trees provide foraging sites for insects.

## • Upland mixed pine-hardwood forest

Upland sites where stands of timber are a mixture of pine and hardwood can provide excellent bear habitat. Typically, the hardwood component is composed of hickory, oak, cherry, sweetgum, and beech. Forest management activities should favor the oaks and other hard-mast species. Harvest operations should provide open canopies where soft mast and thick brush will develop.

## • Special considerations

Any forest management plan that includes bears as an objective has special considerations. Identify and protect present and potential cavity trees, especially bald cypress, overcup oak, and tupelo gum. With the Federal listing of the Louisiana black bear, you must protect cypress and tupelo gum when they are adjacent to water, with visible sign of defects, and a minimum of 36 inches diameter at breast height (dbh).

Regeneration of cypress and tupelo is generally from stump sprouts of trees up to 14 inches dbh, if sufficient sunlight is available. Total harvest is usually the best method of regeneration for these stands. Regeneration

from seed is more complex; cypress needs exposed wet soil for germination and continued moisture for about 2 to 3 years for seedling establishment. Removing trees in permanently flooded areas nearly always results in conversion of forested wetlands to open water. Thin species by age 20, with regular thinning at 10-year intervals thereafter to remove poorer quality stems.

Provide thickets for escape cover. These can be composed of any species, but in particular, switchcane thickets or brakes historically are associated with the Louisiana black bear. Switchcane can also provide a seasonal food source and should be favored in hardwood stands. It can be encouraged through removal of overstory trees and can be artificially regenerated by seed or rhizome transplanting.

Logging and access roads that provide a permanent approach to occupied bear habitat should be located a minimum of half a mile apart. Control vehicular access by using gates or permanent road closure after logging to minimize disturbance to bears.

Maintain some forest openings within large expanses of forest so early successional fruiting species or planted food crops such as corn in summer and wheat in winter can be provided.

### • **Agriculture**

Manage agricultural land to improve bear habitat. Agricultural practices beneficial to bears can include proper crop selection, development of travel corridors, or even conversion of agricultural land to forest.

Corn, sugarcane, and winter wheat are better bear crops for food and cover than soybeans or cotton. Locating crops next to forested areas and leaving strips of crops unharvested are positive management techniques. **Always use pesticides and herbicides in accordance with label guidelines.**

Vegetative buffers left unsprayed next to forestland help prevent drift into the forest edge. For producers participating in acreage-reduction programs, set-aside acreage can be located or used in a manner that creates beneficial wildlife habitat. Plant at least 50 percent of the set-aside lands, not to exceed 5 percent of the crop acreage base, to an annual or perennial cover crop by November 1 of each year.

Locating set-aside acreage next to sloughs, SMZ's, and forestland can provide connecting corridors or wider expanses of cover for bears. Fallowed lands grow up into suitable bear cover habitat and allow bear use and movement between fragmented habitats. Make these areas as wide as possible.

### • **Food plantings**

Food plantings developed in forested habitats for game species are not necessarily bad for bears. Commonly planted forage species include clovers, wheat, ryegrass, and bahiagrass. Wheat is particularly good when the heads are in the late "milk" stage.

### • **Conservation Reserve Program**

A Conservation Reserve Program offers incentives for wildlife habitat practices. The following CRP practices are the most desirable for black bears.

- CP-3 Tree Planting (pine)
- CP-3A Tree Planting (hardwood)
- CP-4B Permanent Wildlife Habitat (corridors, noneasement)
- CP-4D Permanent Wildlife Habitat (noneasement)
- CP-12 Wildlife Food Plots
- CP-25 Rare and Declining Habitat Restoration

CP-4 practices require the landowner to plant at least 30 percent hardwood/shrub, which is Mississippi's policy. CP-4B and 4D require planting a mixture of herbaceous, shrub, and tree species best suited for various wildlife species in the area. A minimum of 30 percent of the acreage must be planted to trees or shrubs, or a combination of the two (no pine).

Hardwood species preferable for black bears include trees (oaks, pecan, hickories), shrubs (blueberries, huckleberries, and other fruiting species), and other mast-producing species. CP-25 requires a site-specific plan to accomplish the intended purpose.

Under CP-12, 5 percent of the acreage, up to 5 acres, can be planted to annual food plots. Corn is a good first choice for a summer crop, and wheat is a good choice for a winter crop. Diversify mast-producing trees and shrubs, where these are planted, and include hard-mast sources such as red oak, white oak, and sweet pecan and soft-mast sources such as black gum, mulberry, hackberry, persimmon, haws, plums, dogwood, and sassafras.

Even if landowners do not specifically include bear management objectives in reforestation and CRP efforts, bear habitat is usually enhanced from these practices.

### • **Landscape level**

Because of the large home ranges of black bears, suitable habitat is seldom owned or provided by one landowner, with the exception of government agencies or industrial landowners. It is important, therefore, to involve multiple adjoining landowners working together at a landscape level in a cooperative effort.

Landscape level management objectives include the following situations:

- Preventing further habitat fragmentation.
- Connecting fragmented habitat with corridors.
- Effectively using fragmented resources by integrating management.
- Focusing efforts of user groups toward common goals.

Successful management depends strongly on the willingness, ability, and commitment of landowners to work closely together. Ultimately, for the bear, coordinated landscape management may offer the best opportunity for bear restoration and management in the Southeast. One excellent example of how this may be accomplished is exhibited by the Black Bear Conservation Committee. This multidisciplinary group has worked with Federal and State agencies to form Bear Management Units (BMU's). Each BMU is coordinated by a team made up of landowners, agency personnel, and local leaders, who provide input into BMU plans.

## Human versus Bear Conflicts



Black bears are usually nonaggressive animals and pose a threat to people only when threatened or provoked. Bears and humans can coexist peacefully when high-quality habitat is available and humans are willing to reduce conflict situations. Conflicts are inevitable, however, even when bear numbers are low; as Louisiana black bear restoration efforts succeed, more conflicts are expected.

Reported conflicts include damage to apiaries and crops, but crop and property damage by bears is limited compared to other kinds of property and crop losses. Locally, however, damage to bee hives can be severe.

Black bears have damaged pressure-treated wooden structures such as deer stands, signs, and outbuildings. Occasionally, bears may eat corn from feeders used to attract wildlife, or they may scavenge animals caught in commercially set traps. Bears can become a nuisance around garbage dumps, cabins, and campsites, where garbage or foodstuffs are available.

Livestock predation is not presently a problem in the range of the Louisiana black bear. **Attacks on humans are unlikely, because bears are secretive and have a retreating nature.**

Landowners, farmers, and others show a high tolerance for bear-caused damage and are likely to accept minor damage as a normal part of business.

Beekeepers, however, do not have a high tolerance level and have encountered problems with bears.

Continued public education and damage assistance rela-

tive to the management of human/bear conflicts are important parts of the future success of the Louisiana black bear restoration.

## Human Behavior

Unprovoked attacks on humans are uncommon throughout the species' range. Most attacks occur when humans surprise or otherwise threaten the animals. Avoid bears in all situations. Bears that become tolerant of human activity may become aggressive, especially if a handout is expected. **Feeding bears is not recommended in any situation!**

Never approach bear cubs; a sow with cubs is defensive and can be dangerously aggressive if she thinks her young are in danger. Be as noisy as possible in bear habitat. When camping, store food and other attractants far from sleeping areas.

Promptly report "friendly" bears. In confrontational situations, identify yourself by making noise and moving upwind of the bear; stay calm and retreat as soon as possible. Bears that confront humans often rear on their hind legs to get a better view or smell; this is a nonaggressive behavior. Do not climb trees.

**Remember**—bears are excellent climbers.

## Hunter Cooperation

Hunting clubs should consider incorporating bear awareness and management techniques into their annual activities. Discourage feeding deer unless the hunters are willing to accept foraging bears at their feeders. Hunting dogs may chase bears; where bears are present, control dog running.

Spring running of dogs can adversely stress sows and cubs. In some areas, controlling untamed dogs may be necessary. Always identify hunting targets carefully before firing; black bears may easily be mistaken for wild hogs or Russian wild boars.

## Apiaries

A 1994 survey of Mississippi commercial beekeepers indicated that over the previous several years most respondents had never seen a bear, but some had experienced bear-related damage to their apiaries. Damage to bees and hives is the most costly agricultural problem associated with the Louisiana black bear; bears eat larvae and honey. Beekeepers can initiate prevention strategies that preclude or minimize bear-caused damage.

Locate beehives as far as possible from bear habitat that provides cover and travel areas. Harvest honey as soon as possible after the seasonal nectar flows. Also, move the hives to new locations if bear activity is detected nearby.

Help protect apiaries with electric fencing, bear-resistant platforms, or get professional help. Bear-resistant fence designs are available from USDA/APHIS/Wildlife Services. Beekeepers may also consider consolidating hives to form the smallest apiary that can be practically managed.

## Crops and Livestock

Crops and livestock may occasionally provide food for bears; as apiaries, do not locate them in or near occupied bear habitat. Protect gardens, small fields, and pastures with bear-resistant fencing, and harvest crops promptly when mature.

Use scare devices such as gas exploders, lights, sirens, and scarecrows to temporarily frighten bears away from crops and fields; these are short-term control measures. Harassment with chase dogs may be effective short term, but in most cases is illegal. With livestock operations, take carcasses of dead animals to an approved landfill site or deeply bury or burn the carcass to prevent scavenging by bears.

## Structures

Where bears could damage wooden structures, use alternate materials such as steel, aluminum, or fiberglass. Remove from unoccupied buildings and store in bear-resistant containers any foodstuff that attracts bears. These foods may include items such as human food, pet food, grains, and foods that attract wildlife.

## Access Management

Most private landowners control access to their properties by fences, gates, signs, patrol, or by word-of-mouth. Public agencies also control traffic on public properties. Consider bears in any periodic review or adjustment of access control techniques and management.

## Roads and Other Hazards

Vehicles kill bears when they cross highways, particularly on roads that cross historic bear travel corridors. Natural resource agencies should assist roadway authorities in identifying these corridors so they can implement collision-prevention methods such as culvert crossings. Drift fences can be placed to direct bears to culvert entrances and facilitate movement beneath the roadbed.

Preventing human injury or death from collisions is a major priority and concern. Possible accidents may be anticipated and avoided by informed drivers. Informational billboards, bear crossing signs, brochures, and reduced speed limits around crossings areas may help avoid problems.

## Garbage/Landfills

Bears like garbage, and those that obtain meals regularly from landfills, dumpsters, or residential garbage cans may soon become a nuisance. This undesirable behavior is almost impossible to change; “garbage dump bears” usually have to be destroyed.

In occupied habitat, enclose landfill perimeters with bear-resistant fences. To reduce odors, maintain only a small exposed area of garbage, and cover fresh-dumped areas with a deep layer of dirt as frequently as possible. Homeowners need to put garbage in closed containers located away from occupied areas. Hunting clubs should dispose of animal offal by hauling to approved landfills, burying, or completely burning it. Keep skinning sheds and food-handling areas immaculately clean.

## Solutions

Restoration depends on the immediate and effective responses by wildlife professionals to reported conflicts. In the past, some individuals have destroyed bears as a means of “conflict resolutions.” Help reduce conflicts by managing the animals involved in the conflict, manipulating the resource being damaged, or placing a physical or psychological barrier between the conflicting resource and the bear.

One goal of the Black Bear Conservation Committee is to promote the natural establishment of a viable population of the Louisiana black bear in suitable habitat. Conflict resolution relies on nonlethal damage control techniques such as barriers and resource management strategies. Due to low densities, destruction of offending animals is considered as a last resort, unless human health or safety is jeopardized.

Hunting is commonly considered as a damage control tool with many species. Consider legal harvest as a part of the overall management plan in the future, as bear densities increase to a level that will sustain harvest and, thus, reduce conflicts. Live trapping and releasing bears into the same general area after aversive conditioning may alter offensive behavior and resolve some conflicts. However, releasing bears far from the capture site may cause them to roam long distances in search of familiar territory. This increases susceptibility to vehicular collisions or negative human encounters. Leave conflict bears in their established territories whenever possible.

# Agency Responsibility



State and Federal agencies work cooperatively to develop protocols for addressing conflicts. The responsibilities relative to conflict management include the following:

- In Louisiana and Mississippi, reported problems are handled by the U.S. Department of Agriculture Wildlife Services, in consultation with the U.S. Fish and Wildlife Service and the Louisiana Department of Wildlife and Fisheries or the Mississippi Department of Wildlife, Fisheries and Parks.
- Texas Parks and Wildlife Department provides assistance to citizens who report problems with bears in Texas.
- In Arkansas, the Arkansas Game and Fish Commission handles bear problems.

As with any wildlife population, the objectives and attitudes of landowners, land managers, resource users, and the general public determine if bears are considered an asset or a liability. Continued research and responsible management of bear habitat and populations can result in perpetuation of this wild resource in the Lower Mississippi River Valley region. Public education can provide knowledge to allow people to form unbiased opinions and make informed decisions about the Louisiana black bear.

## Assistance Programs



State, Federal, and private programs can assist private landowners in implementing timber, wildlife, and conservation programs. Options may include a variety of conservation practices landowners can choose from to meet their needs.

### Farm Services Agency Programs

#### Conservation Reserve Program

The Conservation Reserve Program (CRP) was reauthorized under the 1996 Farm Bill, which is administered by the Farm Services Agency. The program's intent is to protect highly erodible and environmentally sensitive lands by maintaining protective vegetative cover such as trees and grasses. Wildlife considerations are enhanced under the new bill. Cost-share assistance is available to implement conservation practices. Landowners receive annual payments to maintain conservation practices; this is in addition to annual rental payments.

## Natural Resources Conservation Service

### Environmental Quality Incentives Program

Another part of the 1996 Farm Bill is the Environmental Quality Incentives Program (EQIP), which combines the functions of the Agricultural Conservation Program (ACP), Water Quality Incentives Program, and other USDA programs. EQIP provides technical assistance, cost-share funds, and incentive payments for structural and land-management practices to improve water quality on agricultural lands.

### Wetlands Reserve Program

A Wetlands Reserve Program (WRP) was reauthorized under the 1996 Farm Bill. The WRP assists landowners in restoring eligible prior-converted cropland and protection of limited amounts of adjacent wetlands.

### Wildlife Habitat Incentives Program

Another 1996 Farm Bill provision includes the Wildlife Habitat Incentives Program (WHIP), which diverts \$10 million per year from CRP to cost-share payments to private landowners for wildlife habitat management plans and improvements. Eligible practices include management for upland wildlife, wetland wildlife, threatened and endangered species, and fisheries.

## U.S. Fish and Wildlife Service Partners for Wildlife

The Partners for Wildlife program provides technical and financial assistance to private landowners. The program helps landowners restore and enhance fish and wildlife habitat. It is primarily centered around restoration of historic vegetation and hydrology, which must comprise 70 percent of the project area.

### State Incentive Program

Texas and Mississippi are the only two states in the region that provide state-funded incentive programs. These programs are administered by their respective state forestry agencies and are mainly geared to reforestation.


### Cooperative Extension Service

The Cooperative Extension Service is a state- and federally funded agency that provides research-based educational and informational assistance to landowners, professionals, and the general public. County Extension agents and wildlife specialists provide information through publications, videos, workshops, seminars, and individual technical assistance on a request basis.

## Private Conservation Organizations

Private conservation organizations work with landowners to develop conservation easements on their properties, which may provide Federal tax benefits, estate tax savings, or protection of natural areas for future generations.

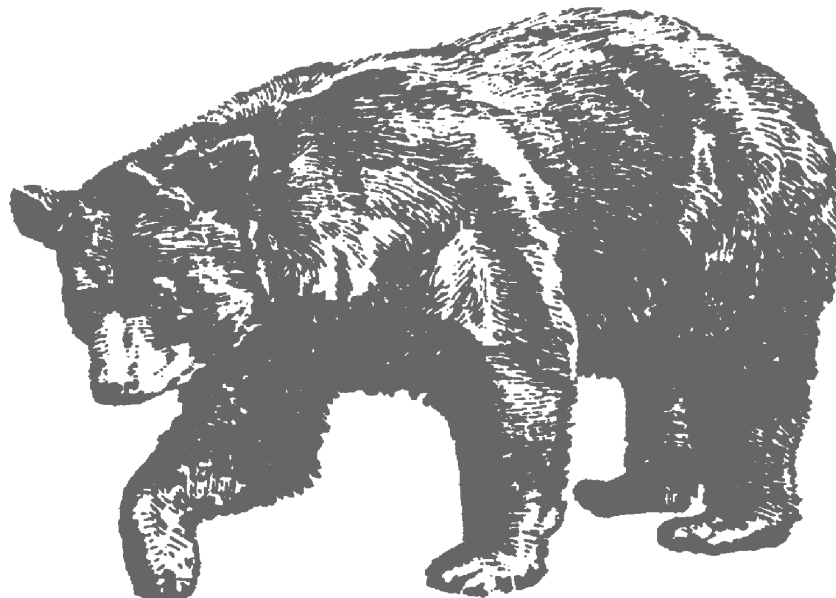
## Summary

 Bears in the Lower Mississippi River Valley region have been reduced significantly since the time of early European explorers; indications are the downward trend is reversible. The decline in forested habitat is leveling off or reversing within the bear's historic range.

Attitudes of the general public and landowners are changing toward acceptance of black bears. People are beginning to understand that black bears can coexist and be managed along with other resources such as crops, timber, and recreation. The public is no longer tolerant of the illegal harvest of black bears, and fines and other punitive measures address this concern.

Perhaps the best hope for black bear restoration in the LMRV region rests with the Black Bear Conservation Committee. Representing more than 60 cooperating agencies, companies, universities, and organizations, the BBCC's priorities are to put the resource first, find common ground, build coalitions, avoid confrontation, use credible science, and to have a strong commitment to black bear restoration and management.

Ultimately, acceptance of black bears depends on the attitudes of the people in the LMRV region. Working together, everyone can contribute to the restoration and management of the Louisiana black bear.







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# Bobwhite Quail

# Supplemental Food and Cover Plantings for Bobwhite Quail in Mississippi



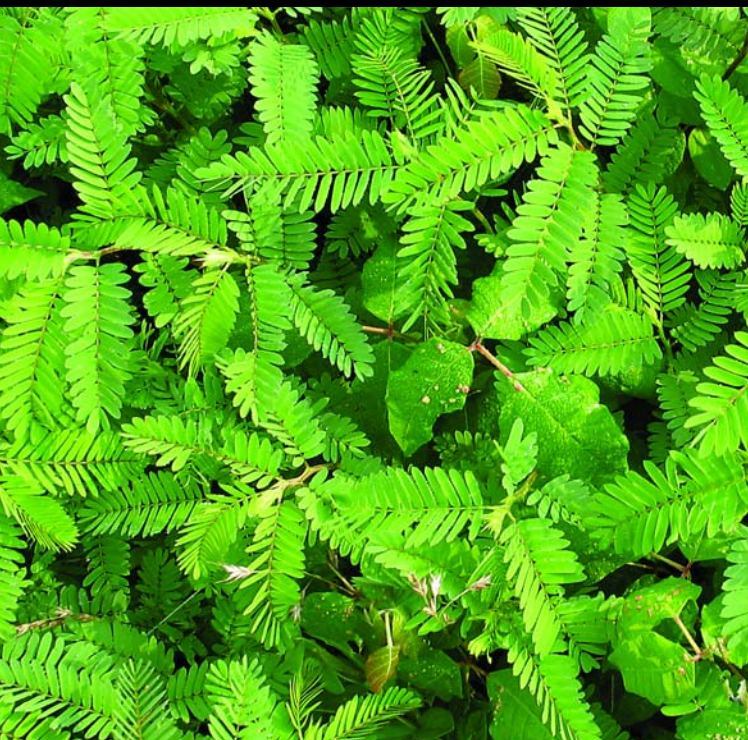
The northern bobwhite, commonly called the “bobwhite quail” in Mississippi, is an important game species whose populations have been declining for 30 years throughout the southeast. This publication provides specific information on managing resources you have and establishing new supplemental plantings to benefit quail.

One common question people interested in bobwhite quail ask is, “What should I plant to help the birds?” Although supplemental plantings may be an important part of management, the importance of supplemental plantings for quail often is misunderstood. A successful quail manager must understand all of the bird’s annual habitat requirements, determine which requirements are missing on the land, and implement a comprehensive management program to provide for those needs.

If you do not have a comprehensive quail management strategy, supplemental plantings won’t have much of an impact. For example, if your property does not have adequate nesting or brood-rearing cover, planting food plots probably will not increase the number of coveys you find during the hunting season. For detailed information about bobwhite quail and their management, pick up “Ecology and Management of the Northern Bobwhite” from your county Mississippi State University Extension Service office, or find it online at <http://msucares.com/pubs/publications/pub2179.htm>. Also, the Mississippi Department of Wildlife, Fisheries and Parks (MDWFP) has information about bobwhite quail management on its website at [www.mdwfp.com](http://www.mdwfp.com).

Once you have developed a comprehensive management program, you may use supplemental plantings to meet specific goals and objectives. Quantity, quality, and availability of food can occasionally limit quail populations. Abundant foods, especially those available during the stress period of late winter/early spring, can help quail begin the summer reproductive period in better condition. Additionally, birds that spend less time feeding might be less vulnerable to predators during late winter when cover is sparse and there are more migratory birds of prey.

Supplemental plantings can also provide brood or nesting cover.



## MANAGE EXISTING RESOURCES

**Agricultural fields** - Where small grains are grown, one way to provide quail with supplemental food and cover is simply to leave a border of crop standing around the edge of a field. This is a cost effective way to provide a variety of agricultural foods, some of which can be difficult to cultivate in small patches because of intense deer browsing. In situations where lands are leased for farming, contracts can be developed to require the farmer to leave a small portion of the crop standing, typically in exchange for a reduced land rental rate. Even strips as narrow as 10 feet wide can provide a lot of quail food on field edges.

Another effective management practice in agricultural settings is to leave a 20-foot or wider border of native vegetation around all field borders. Allowing natural herbaceous vegetation (grasses, weeds, and such) to grow along agricultural field borders can provide excellent nesting and brood-rearing cover for quail. You should maintain these borders of native vegetation every 2 to 3 years by burning, disking, or selective herbicides to keep them in herbaceous cover and keep out woody brush.

**Native food plants** - In many cases, you can produce important quail foods without actually planting anything! Two very effective and affordable tools available to the quail manager include prescribed burning and disking. Prescribed burning is perhaps the cheapest way to manage quail habitat. Normally done in winter, prescribed burns can remove undesirable woody plants and stimulate important herbaceous ones. And, prescribed burning is a versatile technique you can do in grasslands or woodlands. However, in grassland areas dominated by fescue, bermudagrass, or other exotic plants, burning alone may not improve quail habitat. In these situations, you may have to use herbicides or other tools to create good habitat.

Perhaps second in importance only to prescribed burning, disking also is a valuable tool for quail management. In grassland areas, you can disk to disturb the soil and stimulate the growth of new plants. Most old-field areas contain lots of dormant seeds in the soil. Because disking can “release” these seeds in the soil, you can use this technique to change plant composition and structure in grasslands and produce better quail habitat. You can disk in the spring or fall, but be aware that timing affects plant response. Disking in fall tends to favor legumes like partridge pea and forbs such as ragweed. Spring disking encourages many grass species. Disking is best done in strips on a 2-3 year rotation (Figure 1). Always disk along the contour of a field to reduce the risk of soil erosion.

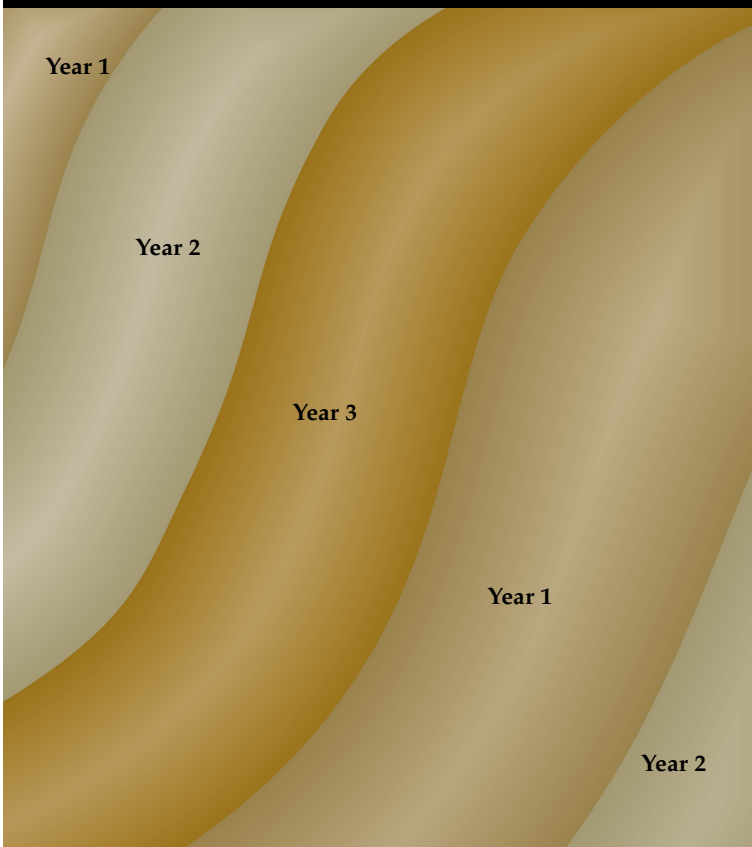


Figure 1. Example of disked strips on a 3-year rotation. Be careful to disk along elevation contours to reduce erosion.

## ESTABLISH NEW PLANTINGS

**Food plot design** - Before deciding which plants to include in your food plots, you should first consider the number, size, shape, and location of the plots. Food plot size and shape are important because they influence the amount of edge around a plot, which occurs where different types of habitat come together. Because quail depend on edge habitat, your management practices should create as much edge as possible across your property. Planting several smaller food plots, rather than a few large ones, and making those plots an irregular shape maximize the amount of edge and thus make food plots more valuable for quail. In addition, you should carefully consider and plan where to establish food plots. For example, the best food plots are next to areas with good escape cover. Also, you should know the soil types on your property and understand the requirements of different plants before selecting the location and type of food plot to plant. Once you decide on the number, size, shape, and location of food plots, you may then select which plants to propagate.

**Rotational plantings** - When establishing annual food plots, you should consider rotating your food plots each year and leaving some portion of the plot unplanted or fallow. In some cases, quail benefit more from the native weed community found in a fallow food plot than from the actual food planting itself. An example of this technique would be to establish strip plots of grain sorghum along the border of a grass field. The next year, leave that plot undisturbed and establish a similar strip plot beside the fallow plot. The soil disturbance associated with preparing a good seedbed for planting encourages growth of many beneficial grass and weed species. Also, these fallow areas create a habitat that harbors plenty of insects necessary for broods. They also provide bare ground to let quail chicks move around.

**Reseeding Annual Plantings** - A number of reseeding annual plants can be established to provide important quail food. With proper management, these plants can be maintained for several years without replanting. Of all these plants, partridge pea and kobe lespedeza may be the most popular across the Southeast. While these legume seeds are fairly expensive, it is important to remember that a single planting can provide food for several years with proper maintenance.

### Partridge Pea

Soil Adaptation: Most Mississippi soils, but avoid extremely wet sites.

Planting Date: February - March.

Planting Rate: Broadcast 10-15 lbs./acre. Cultipack or lightly harrow to cover.

Fertilization: 200-300 lbs./acre 0-20-20, or as recommended by soil test.



Other Considerations: Partridge pea stands usually do well for a few years but require maintenance to persist several years. You can maintain partridge peas by burning and disking in January and February.

#### **Kobe Lespedeza**

Soil Adaptation: Suited to most soils; does not grow well on deep sands or very wet soils.

Planting Date: Early spring (2 to 4 weeks before last spring frost is considered optimum).

Planting Rate: Broadcast 30-40 lbs./acre; cover lightly.

Fertilization: 200-300 lbs./acre 0-20-20, or as recommended by soil test.

Other Considerations: Best results when pH is 5-6.5.

Effective maintenance includes spring burning or disking where previous year's plot was grown.

#### **Florida Beggarweed**

Soil Adaptation: Well- to moderately-drained sandy loam soils.

Planting Date: April - May.

Planting Rate: Broadcast 10-15 lbs./acre.

Fertilization: 300-500 lbs./acre 5-10-15, or as recommended by soil test.

Other Considerations: May volunteer annually following soil disturbance.

#### **Wild Reseeding Soybean**

Soil Adaptation: Best on well-drained soils of average or better fertility.

Planting Date: April 15 - June 1.

Planting Rate: 20-25 lbs./acre broadcast, cover about 1 inch; 8-10 lbs./acre drilled.

Fertilization: 300-400 lbs./acre 0-14-14, or as recommended by soil test.

Other Considerations: Disking in early spring can encourage regeneration in previously planted areas.

#### **Annual Plantings**

Several annual plantings are beneficial to quail, and most are relatively inexpensive to start. Although new plants and plant varieties are constantly marketed for wildlife management, the traditional plantings are still the most effective and affordable.

#### **Millet (Browntop)**

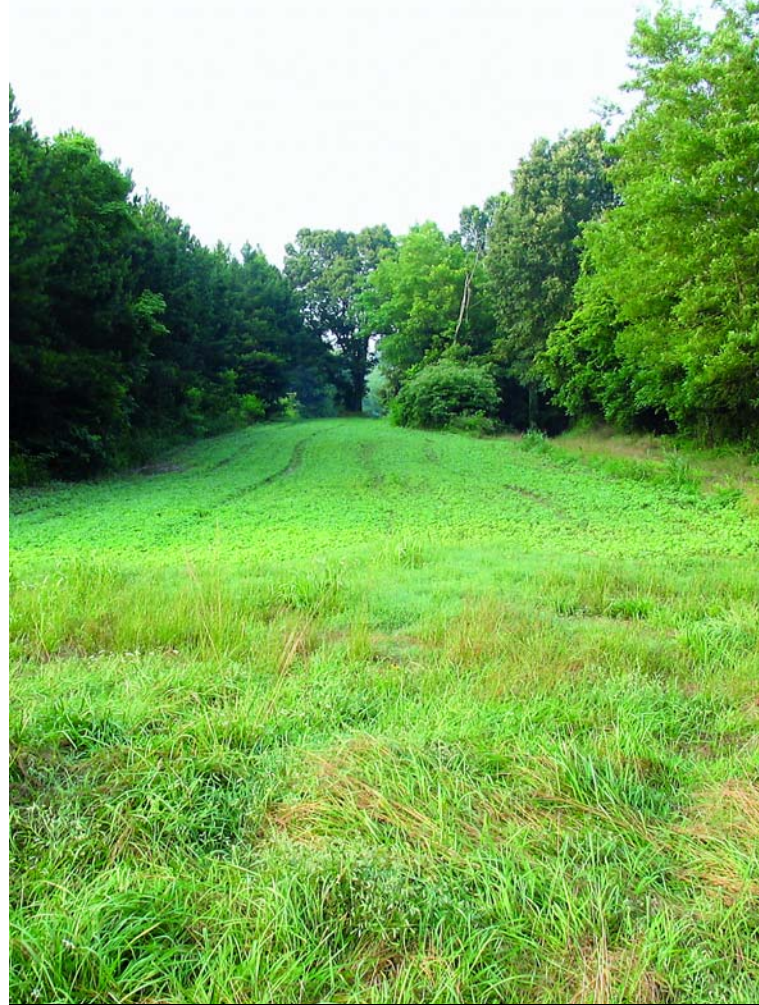
Soil Adaptation: Most upland soils and bottomland soils with a water table less than 4 inches from the surface.

Planting Date: June - August.

Planting Rate: 20 - 30 lbs./acre broadcast, or 8-15 lbs./acre broadcast.

Fertilization: 300 - 400 lbs./acre 13-13-13, or as recommended by soil test.

Other Considerations: Generally produces mature seed within 60 days. Plant on clean, well established seedbed.



### **Millet (Proso)**

Soil Adaptation: Suited to most Mississippi soils but does not grow well on sites with excessive moisture. Relatively drought tolerant.

Planting Date: Late May - July.

Planting Rate: 20-35lbs./acre broadcast; or 12 -15 lbs./acre drilled.

Fertilization: 200-300 lbs./acre 13-13-13, or as recommended by soil test.

Other Considerations: Plant on clean, well established seedbed.

### **Sorghum (including milo)**

Soil Adaptation: Adapted to a wide range of soils, best suited to well-drained sites with pH 5.5 - 6.5.

Planting Date: April 15 - May 30.

Planting Rate: 15-20 lbs./acre broadcast, covered about 1 inch; or 8 - 10 lbs./acre drilled.

Fertilization: 300 lbs./acre 13-13-13, or as recommended by soil test.

Other Considerations: Do not select bird-resistant varieties for wildlife purposes.

### **Egyptian Wheat**

Soil Adaptation: Grows well on most soils, best suited to moderately to well drained soils.

Planting Date: April - July.

Planting Rate: 15 lbs./acre broadcast, covered 1 inch; or 5 lbs./acre drilled in 36 inch rows.

Fertilization: 200 lbs./acre, or as recommended by soil test.

Other Considerations: Not a true wheat, but rather a tall (often more than 7 feet) member of the sorghum family.

Plant in patches to provide both food and cover.

### **Laredo Soybean**

Soil Adaptation: Moderate to well-drained soils.

Planting Date: May - Early June.

Planting Rate: Broadcast 50 - 60 lbs./acre on a firm, clean seedbed and cover 1 inch; or drill 30 lbs./acre (20-30 inch rows, with 8-10 inch spacing).

Fertilization: As recommended by soil test

Other Considerations: Produces hard, black seed, often viable into late winter. Not a good choice for small plots in areas of high deer density, although Laredo may be less susceptible to heavy deer use than some production soybeans.

### **Shrub Plantings**

Quail rarely move more than 150 yards from quality woody cover, so shrubs are a very important habitat component for quail. You can use shrub plantings such as bicolor lespedeza and American plum to provide both food and cover for quail and other wildlife. You can also use shrubs to "break-up" extensive open areas, such as large crop fields, into smaller management units.





### **Shrub Lespedeza (bicolor, thunbergii, and others)**

Soil Adaptation: Best on well-drained sites, not suited to very deep sands or some prairie soils with high pH.

Planting Date: March - April.

Planting Rate (seeds): Broadcast 15 lbs./acre scarified and inoculated seed; or drill 10 lbs./acre of scarified and inoculated seed in 36 inch rows.

Plant Spacing (seedlings): Plant seedlings 24 inches apart in 36 inch rows.

Fertilization: 400 lbs./acre 0-20-20, or as recommended by soil test.

Other Considerations: Mowing in early February can restore older stands of shrub lespedeza by encouraging regrowth. Ask your seed supplier about deer resistant varieties if planting in areas with high deer density.

Landowners should be cautioned that shrub lespedeza, particularly bicolor, can become an invasive plant in some areas.

### **American Plum**

Soil Adaptation: Best on well-drained soils.

Planting Date: April - May.

Plant Spacing: Plant seedlings on 5' x 5' grid, or in compact clusters of 3-4 seedlings.

Fertilization: As recommended by soil test

### **Warm Season Grasses**

Establishing native warm season grasses (NWSG) to benefit quail is increasingly becoming a popular management practice. While NWSG, such as switchgrass, big and little bluestem, Indiangrass, Eastern gammagrass, and broomsedge are not important food plantings, they provide excellent quality nesting cover for quail and other grassland birds. NWSG benefit quail because they are bunch grasses. They grow upright with mostly bare ground between clumps or bunches of grass. This provides overhead cover for protection and material for nest construction, but it also lets young quail move through the cover.

Establishing NWSG can be difficult and expensive. Generally, you should plant NWSG in May and June on a clean, well-prepared seedbed. Use a cultipacker to smooth and compress the soil before and after planting. NWSG seeds may be broadcast with some success, although drilling is considered the preferred method of seeding. Some NWSG species can be planted with conventional equipment; for example, switchgrass can be planted with a grass seed box on a normal grain drill, and Eastern gamagrass can be drilled using a corn planter. However, many NWSG species have bearded or fluffy seeds that will not pass through conventional equipment and thus require





specialized drills or broadcast seeders. If you are interested in establishing NWSG on your property, contact your plant material provider, the Natural Resources Conservation Service, or MDWFP for additional technical information.

### Management of Deer Plantings to Benefit Quail

Many landowners who plant food plots for deer also have interests in quail and other wildlife. You can help quail by selecting the proper plant material for deer plots. Many traditional deer plantings can provide quality brood-rearing cover for quail. Cool season mixes of clovers and cereal grains such as wheat and oats can benefit both deer and small game. However, using ryegrass in fall plantings is generally not beneficial to quail, since the ryegrass tends to choke out other vegetation in the plot. Ryegrass also tends to form a dense mat of vegetation the next summer, which limits the use of the plot by small quail chicks.

You can make existing deer food plots more beneficial for quail through planned management. Leaving a small portion of larger deer food plots fallow can improve the value of these areas for quail. For example, you might plant a 10-acre deer food plot in the fall. The next year, you could leave 1 acre on the north end of the field fallow, and plant the southern 9 acres. The second year, you could plant 9 acres on the north portion of the field, and leave 1 acre fallow in the south end of the field. The weed communities in these fallow areas provide food and cover for quail, and this rotational management makes enhancing larger deer plots for quail relatively simple. If mowing is part of your management plan for deer food plots, avoid it through June to protect nesting hens.

### Develop a comprehensive plan.

Remember that quail can benefit from supplemental plantings, but the greatest benefits occur if food plots are part of a comprehensive management plan. Managers must understand quail seasonal habitat requirements, identify limiting factors on their property, and address those factors with a management program. Contact the Mississippi Department of Wildlife, Fisheries and Parks (Small Game Coordinator Dave Godwin, 662-325-5119) or the Mississippi State University Extension Service for information and technical guidance with quail habitat management.





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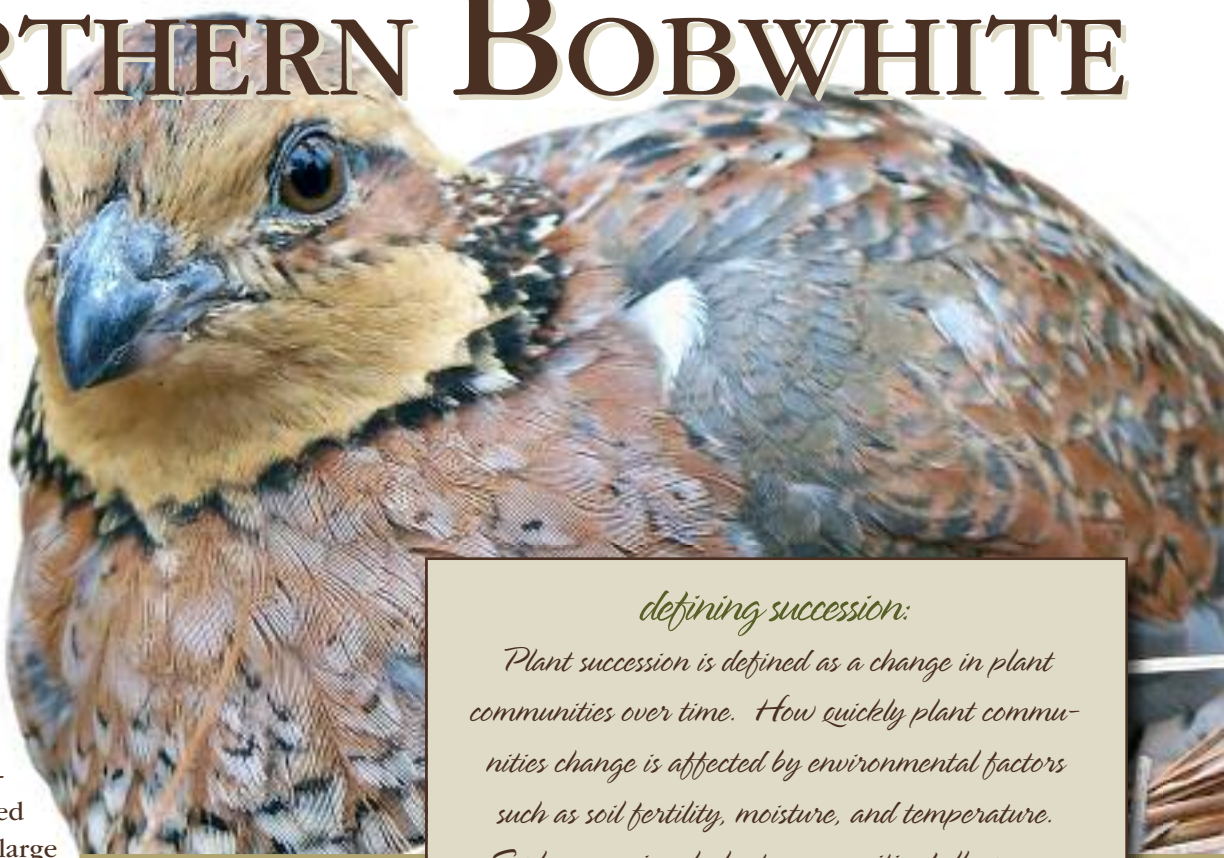
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# *ecology & management of the* **NORTHERN BOBWHITE**



*A* abundant bobwhite populations were once an accidental byproduct of land management practices as early settlers carved out small family farms in large expanses of southeastern forestland. Just as human activity once accidentally created good habitat for bobwhites, changes in the ways we use land have diminished bobwhite habitat quality. In Mississippi and other southeastern states, bobwhite and other wildlife species that depend on early successional plant communities have declined over the last several decades to historically low population levels (*Refer to figure on page 2*).

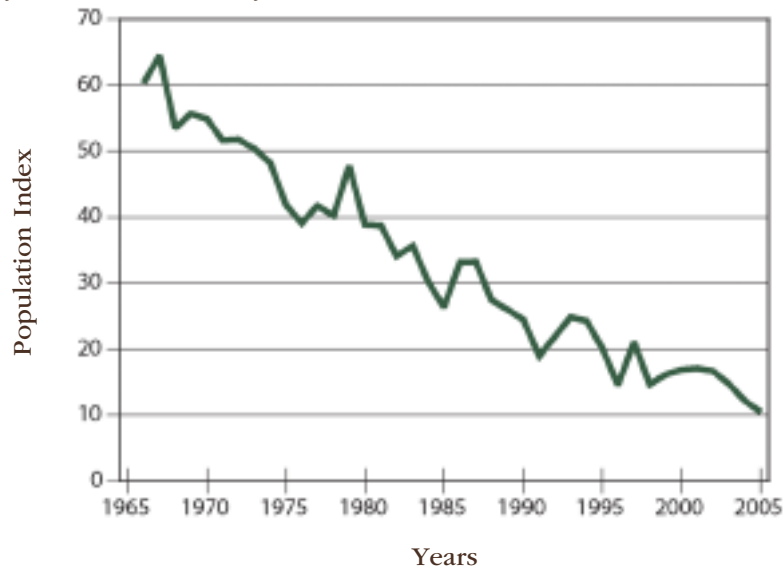
The main cause of the decline in bobwhite populations has been loss of habitat associated with advanced natural plant succession (closed-canopy forests), industrialization of farming and forestry, reduced use of prescribed fire, and extensive conversions of native plant communities to non-native, invasive grasses such as fescue and bermudagrass. Other factors (such as predation and increasing isolation of remaining bobwhite populations), along with deteriorating habitat quality, further contribute to bobwhite population declines.

## *defining succession:*

*Plant succession is defined as a change in plant communities over time. How quickly plant communities change is affected by environmental factors such as soil fertility, moisture, and temperature. Early successional plant communities follow some form of environmental disturbance and are characterized at first by annual grasses and forbs. In most areas of the Southeast, annual plant communities quickly progress to perennial grasses and forbs within a few years. Within four to five years of no disturbance, early successional plant communities are lost as shrubs and trees colonize the site. Early successional plant communities are maintained by disturbances such as fire, hurricanes, tornadoes, or tillage. The goal of bobwhite management is to mimic natural soil or vegetation disturbances, typically by tree harvest, prescribed fire, or disking, to maintain early successional plant communities.*



*Northern Bobwhite population trend measured by counts of calling males along 25-mile Breeding Bird Survey routes in Mississippi, 1966 to 2005.*



*"The intensification of timber and fiber production have reduced available bobwhite habitat in forested regions."*



Agriculture has been a two-edged sword for bobwhite. Early agricultural development created habitat, but intensification of agriculture destroyed habitat. In recent decades conversion of farmlands back to forestland has further eliminated habitat.

Bobwhites thrive in habitats composed of native grasses, forbs, and shrubs. Early agriculture in Mississippi provided habitat for many grassland wildlife species in the form of weedy field margins, fence rows, and other odd areas. Interconnected, small family farms created millions of acres of small agricultural fields and unimproved pastures that once provided nesting, brood-rearing, and protective cover for bobwhites. Since the end of World War II, agricultural production methods have progressively become more extensive and intensive, and chemical control of weeds and insects has increased dramatically.

Grazing practices have also changed significantly over the years. Livestock once grazed on native grasses and other native vegetation. Farmers moved livestock among native grass fields and woodlots producing a patchwork of grazed and ungrazed areas. Today, most pastures and hay fields have been converted to "improved" stands of non-native grasses such as fescue, bermudagrass, or bahiagrass, and are intensively grazed by

animals confined to smaller areas. Non-native grasses provide poor habitat for bobwhites and most other wildlife.

Average farm sizes in Mississippi increased from 54 acres in 1942 to 262 acres in 2005, while the number of farms decreased from 269,000 to 42,200 during the same period of time. As farming became more intensive and industrialized, less productive acreage and less competitive farms were removed from production.

The 1980's saw some of the greatest losses of cropland acreage in Mississippi and other regions of the United States. During this time, hundreds of thousands of former cropland acres were simply abandoned and allowed to grow up in woods or were converted to hardwood or pine plantations or non-native grasslands (such as fescue). These broad-scale land-use changes, many of which have been subtle over time, eliminated large expanses of interconnected grassland wildlife habitat associated with farming in Mississippi.

Just as agricultural practices have changed, forestry practices have also changed. The intensification of timber and fiber production (such as short rotation, high tree-density pine plantations and greater use of chemical site preparation for forest regeneration) have reduced available bobwhite habitat in forested regions.

# ANNUAL CYCLE



## Spring Breakup

In early spring, coveys break up, and male birds begin their familiar “bob-white” whistle to attract females.

## Pair Bonds

Individual males and females will form pair bonds that may last for a single nesting attempt, multiple nesting attempts, or the entire breeding season.

## Winter Covey

From fall through early spring, birds live in a social unit called a covey. Winters are difficult for bobwhite because the weather is cold, food is scarce, and predators are abundant. At night, bobwhite roost on the ground in a circle to conserve energy and for security. Only three to five birds in each covey will survive to spring.

## Winter

### Fall Shuffle

In early fall, broods live together in large groups of 20 to 30 birds. By October, birds will have settled into winter coveys of 12 to 15 individuals. The population (number of birds in an area) is highest at this time of year.

### Summer Life

The chicks grow rapidly and begin to fly in as little as 2 weeks. They spend their days feeding, taking dust baths, hiding from predators, and resting.

## Hatching & Brood-Rearing

After the eggs hatch, the male or female leads the chicks to brood habitats. Young chicks eat mostly insects because they contain the protein and nutrients chicks need to grow. The parent protects the chicks from danger and keeps them warm. A family of bobwhite chicks is called a “brood.”

## Summer

### Nesting

Bobwhite build their nests on the ground in a clump of dead grass to camouflage it. The female will lay about 12 eggs. The male or female incubates the eggs for 23 days. Nesting is a dangerous time because many predators eat eggs and adults. Only one of every three nests hatches.

## Courtship and Nesting

Early spring is a time of dispersal for bobwhites preparing for reproduction. Habitat use shifts from shrubby and woody habitats used in winter to more open, grassy portions of the landscape. During the breeding season, it is not uncommon for about 25 percent of the population that survives the winter to move to new areas more than 2 miles from their winter range. These birds are likely looking for mates and new habitats.

The familiar two- or three-note “bob-white” whistle of males in early spring to attract a female is the earliest sign the reproductive season is starting. Courting pairs form first in March and April. Pairs form and break, then re-form throughout the breeding season, from May to September. In one breeding season individual bobwhites may pair and try to nest with as many as three different mates.

*“Pairs form and break, then re-form throughout the breeding season, from May to September.”*

## Life History and Ecology

Understanding bobwhite life history and ecology provides the background for managing this bird. By understanding the various aspects of a bobwhite’s life and seasonal habitat needs, it is easier to understand how to manage bobwhite habitat.



*"Good nesting cover has fairly dense, upright grass cover close to areas with ample bare ground concealed by overhead grass, forb, and shrub cover."*



Bobwhite have a long breeding season, often lasting more than 150 days. This long breeding season provides opportunities for multiple nesting attempts and contributes to the bobwhite's high reproductive potential. Individual nesting attempts may require from 35 to 48 days from making the nest to hatching. Peak hatch is around mid July. Some broods may hatch as early as early May and as late as early October. Nests are incubated by either the male or the female, but bobwhites rarely share incubation duties. Females incubate most of the early-season nesting attempts, but males incubate an average of 25 to 30 percent of all nests. Male incubation is most common during the middle of the breeding season. Often the female initiates and incubates a clutch, while the male incubates a clutch the female laid earlier. Bobwhites readily re-nest when nests are destroyed by predation, weather, or human activities. Some females may produce more than one brood per season.

Bobwhites usually select a nest site where native grasses are the main plant type. Good nesting cover has fairly dense, upright grass cover close to areas with ample bare ground concealed by overhead grass, forb, and shrub cover. These more open, weedy areas provide foraging habitat for the newly hatched chicks.

Male bobwhites build nests in a slight depression in the soil, using available grasses and debris, which often include broomsedge or pine straw. Nest building takes about a day, and the hen generally lays about one egg daily until she has produced the complete clutch of eggs (average clutch is 12 eggs). This usually requires from 15 to 20 days after the nest is built, often with a slight delay between building and the beginning of egg-laying.

Within two to five days of laying the last egg, the female or male starts incubation. Both attending adults and nests are highly vulnerable to mortality during incubation. Predators, agricultural machinery, or weather events destroy

about 55 to 70 percent of nests. The attending adult is killed in about 25 percent of nest failures. Because females incubate 70 to 75 percent of nests, they typically experience greater mortality than males during the nesting season.

If the nest is successful, the eggs hatch after about 23 days of incubation. Once hatching begins, most chicks emerge within one to two hours. About 33 percent of birds succeed on the first nesting attempt, and bobwhite hens may re-nest two to three times, whether the first brood was successful or not. Despite this high reproductive potential, not all pairs successfully produce a brood because of weather, predation, and other disturbances. Through repeated re-nesting, about 75 percent of the birds surviving the breeding season ultimately hatch one or more clutches.

### *Brood-Rearing*

When bobwhite chicks hatch, they are covered in down, with eyes open, and can move around. Newly hatched chicks weigh about 0.25 ounces and are not much larger than bumblebees, but they can forage for themselves soon after hatching.

As soon as the chicks are dry, the hen leads them away from the nest to begin foraging on insects and other invertebrates. They are very alert, move around on the ground quite readily, and cannot fly for the first two weeks after hatching. Attending adults watch the chicks closely, and the brood may cover from two to 100 acres during the flightless period. Hens take the chicks to insect-rich areas with overhead cover for protection from predators, intense heat, or wet conditions and in which small chicks can move freely along the ground and through vegetation to feed. Annual plant communities provide good brood cover.

The first two weeks after hatching are the most critical, because 50 percent or more of chicks may be lost to predation or bad weather. The attending adult broods, or covers the chicks with its wings during the night and much of the



*"Hens take the chicks to insect-rich areas with overhead cover for protection from predators, intense heat, or wet conditions and where small chicks can move freely along the ground and through vegetation to feed."*

day to keep them warm and protect them from predators. Bobwhites are dedicated parents and hesitate to leave flightless chicks, even when attacked by a predator. Although predation is high during incubation, adult mortality associated with attending flightless chicks is twice as great as incubating a nest.

Between weeks two and six, chicks develop juvenile plumage and flight abilities. By six weeks of age, chick diets shift from only insects to insects along with seeds, berries, and other plant material. At eight weeks, hens are readily identified from cocks by the brown feathering in the throat patch, whereas cocks have a white throat patch and a black eye stripe and collar. At 12 to 16 weeks, the size of young closely resembles that of adults. By the age of 21 weeks, bobwhites have the plumage they wear into the next breeding season. Juveniles can still be identified from adults for a full year by the more-pointed ninth and tenth primary wing feathers and buff-colored tips of the greater primary coverts.

Summer life for birds of all ages consists of daytime activities of traveling, feeding, dusting to clean feathers, and

loafing. They may feed during early morning, rest during mid morning, loaf, sleep, and dust during the middle of the day, and feed during the two to three hours before dark. The bobwhite's preferred way to travel is on foot. Flying requires more energy than walking and running and exposes birds to predators such as hawks and owls. Shrubby cover such as plum thickets or briar patches provide both secure loafing cover and escape cover for bobwhites during these daily activities.

### *Covey Structure*

By late summer bobwhites begin to show the characteristic night roosting habits of forming a circle on the ground with tails together and heads pointing out. This may have important social, escape, and heat conservation benefits.

In late summer and early fall, birds begin to mix from brood to brood and form coveys, or social groups, of 20 to 30 birds. These coveys may reduce to groups of 10 to 15 birds as each covey settles into its winter range. This period is often called the "fall shuffle," and populations have reached their peak for the year. As fall and winter arrive, food is most abundant, birds move about less, and the tight-knit coveys are 75 to 80 percent juvenile birds. Depending on habitat quality, each covey may require from 20 to 160 acres or more to meet its needs.

As much as 50 to 75 percent of the early fall population may die by the following spring. As winter progresses, cover and food resources become more limited. Protective cover such as plum thickets or briar patches throughout an area can provide critical cover after grass and forb covers have deteriorated during winter.

For birds that survive winter, longer daylight and warmer weather in spring trigger the gradual breakup of coveys. The bobwhite calls begin in earnest, and pairing begins again as the next breeding season arrives.



*annual plant community*

*"During the 'fall shuffle,' populations have reached their peak for the year. As fall and winter arrive, food is most abundant, birds move about less, and the tight-knit coveys are 75 to 80 percent juvenile birds."*



# Plant Succession



## Habitat Management

Although bobwhites can adapt to grasslands, agricultural crops, and woodlands if properly managed, too much of one results in lack of another and reduces habitat quality. Many modern land use practices simplify the landscape by producing too much of one plant community or land use type while excluding others. For example, intensive agricultural and forestry practices emphasize food and fiber production but eliminate the patchy landscape bobwhites require.

With the gradual (and sometimes radical) land use changes that have occurred in Mississippi during the last half-century, proactive bobwhite habitat management has become imperative to maintain harvestable populations of bobwhites and, in some cases, just to maintain localized populations. Bobwhite habitat is no longer an accidental byproduct of land use but must be intentionally created.

### *Open Lands*

Open lands include agricultural land uses such as row crops, pastures, hay fields, Conservation Reserve Program (CRP) grasslands, and nonagricultural grasslands such as prairies and old fields. Because of the open nature of these land uses, they are often the easiest habitats to manage for bobwhite, and existing bob-

white “seed” populations are usually associated with these land uses. Many effective habitat management tools are available to create or enhance bobwhite habitat in open lands. One or more of the following management options that are compatible with production goals can be used to increase the amount of usable bobwhite habitat in cropland habitats.

Old fields provide suitable bobwhite habitat for two to three years after abandonment because grasses, forbs, and shrubs colonize fields when they are no longer cultivated. Many crop fields were removed from agricultural production and allowed to go back to natural grass cover during the early to mid 1980’s. This accounts for why this period of time experienced some brief bobwhite population booms. However, plant succession causes abandoned fields to “grow out” of bobwhite habitat within a few years.

Without soil disturbances from prescribed fire or disking, abandoned fields are invaded by brush and characterized by heavy litter (such as dead grass) accumulation, thick vegetation at the ground level, and little bare ground and plant diversity. Like abandoned fields, crop fields converted to pine or hardwood plantations provide suitable bobwhite habitat for a short time; but as trees cap-

*“Bobwhite habitat is no longer an accidental byproduct of land use but must be intentionally created.”*



ture the site and canopy closure prevents sunlight from reaching the forest floor, ground cover conditions favorable for bobwhites are quickly lost.



*brush invasion in an old field*



*dense, perennial grasses*

*"Without soil disturbances, abandoned fields are invaded by brush and characterized by heavy litter accumulation, thick vegetation at the ground level, and little bare ground and plant diversity."*

In modern agricultural systems, the availability of idle, native herbaceous vegetation most often limits bobwhite populations. In these landscapes, developing suitable, idle vegetation and/or converting non-native, invasive grasses such as fescue and bermudagrass to native warm-season grasses (NWSG) are essential parts of bobwhite habitat management.

Converting cropland to NWSG and forbs can produce quality bobwhite habitat, but this management option is feasible only if you do not want to continue cropping particular fields. An alternative

### *Native Forbs with Commercial Availability*

- Ragweed (*Ambrosia artemisiifolia*)
- Partridge pea (*Chamaecrista fasciculata*)
- White prairie clover (*Dalea candida*)
- Purple prairie clover (*Dalea purpurea*)
- Illinois bundleflower (*Desmanthus illinoensis*)
- Smooth ticktrefoil (*Desmodium laevigatum*)
- Stiff ticktrefoil (*Desmodium obtusum*)
- Florida beggarweed (*Desmodium tortuosum*)
- Narrow leaved sunflower (*Helianthus angustifolius*)
- Common sunflower (*Helianthus annuus*)
- Maximilian sunflower\* (*Helianthus maximiliani*)
- Oxeye (*Heliopsis helianthoides*)
- Roundhead lespedeza (*Lespedeza capitata*)
- Slender lespedeza (*Lespedeza virginica*)
- Coneflowers (*Rudibida* spp.)
- Blackeyed susan (*Rudbeckia hirta*)

\* Not native to Mississippi, but native to western United States; not known to be invasive in Mississippi.

### *Native Grasses with Commercial Availability*

- Big Bluestem (*Andropogon gerardii*) – Adapted to more neutral soils (such as prairie and Delta)
- Broomsedge (*Andropogon virginicus*) – Adapted to almost all soils in Mississippi; readily colonizes many sites naturally; limited commercial availability
- Sideoats Grama (*Bouteloua curtipendula*) – Adapted to a variety of soil types
- Sand Lovegrass (*Eragrostis trichodes*) – Adapted to poorer, dry soils
- Switchgrass (*Panicum virgatum*) – Adapted to a variety of soil types
- Little Bluestem (*Schizachyrium scoparium*) – Adapted to a variety of soil types
- Indiangrass (*Sorghastrum nutans*) – Adapted to a variety of soil types
- Purpletop (*Tridens flavus*) – Adapted to poorer, dry soils
- Eastern Gamagrass (*Tripsacum dactyloides*) – Adapted to a variety of soil types

\* For more information on native warm-season grasses, see Extension Publication 2435, Native Warm-Season Grass Restoration in Mississippi.



*native warm-season grasses and forbs*

*"Conversion of five to 10 percent of cropland acreage to native grass and forb field buffers can increase local bobwhite populations by 200 percent."*



*native warm-season grass and forb field buffer along a crop field edge (summer)*



*native warm-season grass field buffer in winter*



*field buffer dividing grazing paddocks (fenced to protect from livestock), managed for bobwhite cover*

practice is rotational fallow field crop management (often called flex-fallow), but this management option temporarily removes some acreage from production and reduces cropping potential.

Native grass and forb field buffers established along field edges are a flexible grassland habitat management practice for cropland. Field buffers let landowners create wildlife habitat and continue cropping their fields by sacrificing only minimal amounts of cropland. Field buffers should be at least 30 feet wide for bobwhite habitat, and wider buffers are usually better (buffers usually range from 30 to 120 feet wide). Conversion of five to 10 percent of cropland acreage to native grass and forbs field buffers can increase local bobwhite populations by 200 percent.

Similar to croplands, converting pasture/hay lands to NWSG can greatly increase the value of these production systems for bobwhite habitat. NWSG can be very productive hay and grazing lands, but you must carefully use rotational grazing to avoid overgrazing.

As with cropland, idle field buffers around pastures and hay fields can provide habitat for bobwhites. Pasture/hay buffers let producers sacrifice small amounts of forage production lands. You can create these buffers by fencing out portions of pastures and leaving margins of hay fields uncut. Field buffers along pastures and hay fields require regular maintenance if these forage lands contain bahiagrass, bermudagrass, and/or fescue. If these non-native forage grasses are present, you have to treat the buffer with herbicide to eradicate non-native grasses, and desirable vegetation has to be established. Regular herbicide treatments along the field and buffer edge are necessary to control spread of invasive grasses into buffers from the field margin.

In Mississippi nearly one million acres of former cropland have been enrolled in the Conservation Reserve Program (CRP). Many CRP contracts were not specifically developed for early successional wildlife habitat. CRP grass covers, both whole-

field and conservation buffer enrollments, were often established in non-native grasses such as fescue or bermudagrass. These CRP conservation covers may be converted to bobwhite habitat by eradicating non-native grasses with appropriate herbicides and establishing native grasses and forbs (these stands may be eligible to re-enroll in CRP as a native grass cover). Management activities on CRP lands must be part of an approved Conservation Plan of Operation, so consult with USDA-Farm Service Agency (FSA) personnel before beginning management activities.

Old fields and CRP grasslands that were allowed to regenerate to native vegetation but were not actively managed can also be renovated for grassland wildlife habitat. Because many of these idle grass fields have not been actively managed to maintain early successional habitat, woody brush or non-native, invasive vegetation has moved into these grasslands and reduced their bobwhite habitat value.

Woody brush such as cedar, sweetgum, and green ash and non-native, invasive vegetation such as kudzu and bermudagrass often require herbicidal treatment for long-term control. Controlling non-native, invasive vegetation is more economical and effective if you treat invasive species when they first appear. This is especially true of cogongrass, which is ranked as the seventh worst weed in the world. It is more common in South Mississippi, but isolated infestations have been detected throughout Mississippi. Learn to identify this invasive species, and if you find it, control it. For more information about detecting and controlling cogongrass, contact one of the agencies listed in the "Technical Assistance" section of this publication on the back cover of this publication or the Mississippi Department of Agriculture and Commerce (<http://www.mdac.state.ms.us/index.asp>), Bureau of Plant Industry, Plant Pest Programs, Mississippi State, MS 39762-5207 (662.325.7765).

Although mowing or clipping is the most common practice used to manage vegetation on CRP and other grass stands, it produces poor grassland wildlife habitat. Mowing reduces cover height, favors perennial grasses, and creates a dense litter layer along the ground. If bobwhites and other grassland wildlife habitat are a priority, mow only to control brush or to maintain roads.



*Mowing reduces cover height, favors perennial grasses, and creates a dense litter layer along the ground.*



Strip-disking and prescribed fire are the main tools for properly managing established native grass stands for bobwhites. Prescribed burning should always be conducted by a certified prescribed burn manager, who develops a written burn plan and gets appropriate permits before burning. Check with the appropriate county office of the Mississippi Forestry Commission for more information about prescribed burning regulations. Another reference on prescribed fire, entitled “Prescribed Burning in Southern Pine Forests: Fire Ecology, Techniques, and Uses for Wildlife Management” (Publication 2283), is available through the Mississippi State University Extension

Service (<http://msucares.com/pubs/index.html>). A good reference on light disking for wildlife habitat entitled, “Light Disking To Enhance Early Successional Wildlife Habitat in Grasslands and Old fields: Wildlife Benefits and Erosion Potential” is available through the Mississippi USDA-Natural Resources Conservation Service or from the Natural Resources Enterprises website (<http://www.naturalresources.msstate.edu/>).

Disking can be done from October through March. Fall disking tends to promote hard-seeded forbs and legumes, whereas spring disking promotes annual grasses. Fall disking may be more effective in stimulating important food plants for bobwhite. On sites with an agricultural history, spring disking may promote agricultural pest species. Creation of an annual plant community does not require a seedbed-quality site preparation. Light disking (one to three passes with the disk set at three to five inches deep) can effectively stimulate germination of desirable annual plants. Prescribed burning is generally done winter to early March, but weather conditions will determine when prescribed burns should be conducted.

Rotational strip-disking maintains a mixture of annual and perennial plant communities. To minimize erosion, strip-disk on the contour. You can implement strip-disking on a two- to three-year rotation, disking half to one third of fields each year in a strip pattern. This rotational pattern of soil disturbance maintains one-, two-, and three-year old plant communities and produce bobwhite nesting and brood-rearing cover next to one another within each field. You can rotationally burn fields in a similar strip fashion to disking, or you can divide larger fields with disked strips into halves or thirds, burning each block every two or three years.

Disking and prescribed fire produce annual plant communities that provide essential food and cover resources for bobwhites and other grassland wildlife. Annual plant communities are character-

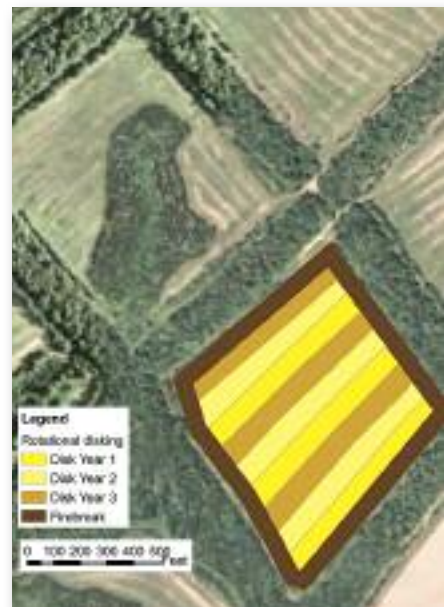
*prescribed burning*



*strip disking*



*vegetation response after prescribed burning or strip disking*



ized by grasses and forbs (especially legumes) that occur after a soil disturbance. Some examples of annual plants include ragweed, partridge pea, and panic grasses. Annual plants produce an abundance of seeds many birds and small mammals use. They also support diverse insect communities that provide critical nutrients for nesting birds and growing chicks. You can plant commercially available forbs (especially legumes) to enhance grassland stands that are lacking an adequate forb component. (Refer to *Native Forbs with Commercial Availability* on page 7.)

Although you do not want woody brush to dominate native grass stands for bobwhite habitat, you do want to protect or create some scattered patches of shrubby cover. Scattered thickets of native shrubs like wild plums, dogwoods, winged sumac, and vines such as blackberry provide escape and loafing cover for bobwhites. Protect existing shrub thickets (cut fire breaks around thickets if you use prescribed burning), or plant seedlings to enhance protective cover in native grass stands. Maintain or create about 10 to 20 percent of grasslands (including cropland field buffers) in shrubby cover. If you are creating scattered shrub thickets by planting, develop thickets about 100 to 300 yards apart. Because of the protective cover they offer during winter, these shrub thickets often

serve as “covey headquarters.” Coveys somewhat center their daily activities about these shrubby thickets to stay in close contact with secure cover.

You can improve woody habitats next to crops or grass fields (such as fencerows and small woodlots) for bobwhite habitat by what is commonly referred to as “edge feathering.” Edge feathering produces favorable bobwhite cover in much the same way as a forest clear cut. Bobwhites often move into young forest clearcuts because grasses, forbs, and shrubs thrive for several years after timber harvests remove large trees that shade the ground. These clear cuts often provide ideal bobwhite habitat for about three to five years. Edge feathering requires removing most of the larger trees to let sunlight reach the ground, favoring growth of native grasses, forbs, and shrubs.

*“Scattered thickets of native shrubs provide escape and loafing cover for bobwhites.”*



*edge feathering*

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### *Native Shrubs To Protect or Plant*

- American Beautyberry (*Callicarpa americana*)
  - Flowering Dogwood (*Cornus florida*), Gray Dogwood (*C. racemosa*)
  - Eastern Red Cedar (*Juniperus virginiana*)
  - Wild Plums (*Prunus americana*, *P. angustifolia*, and others)
  - Winged Sumac (*Rhus copallinum*), Smooth Sumac (*R. glabra*)
  - Blackberry and Dewberry (*Rubus* spp.)
  - Blueberry, Sparkleberry, Huckleberry (*Vaccinium* spp. and *Gaylussacia* spp.)
  - American Holly (*Ilex opaca*), Yaupon (*I. vomitoria*)
  - Wax Myrtle (*Myricaceae cerifera*)
-

You can use cut trees for timber or firewood or leave them on the site. You can partially cut some trees so the tree falls over but stays partly attached to the stump. This way, the tops and limbs remain alive for some time. Stump sprouts from cut hardwoods produce thickets that can be beneficial for bobwhite escape cover.

If you edge feather next to grassland field buffers or large patches of native grassland, a narrow cut (15 to 20 feet wide) may be satisfactory. But if edge feathering is the only habitat management practice you plan, a wide cut (30 feet or wider) is necessary. You can leave scattered mast producing trees (such as oaks, pines, cherries) in the feathered edge for additional food resources. You can enhance these areas by planting native grasses, forbs, and shrubs if a desirable plant community does not establish naturally.

### *Pine Forests*

Pine forestlands are the main forest systems managed for bobwhite habitat in Mississippi, although upland hardwoods can also be managed for bobwhite habitat. Areas that are mostly forestland may be more difficult to manage for bobwhite habitat, especially if bobwhite populations have been absent for some time. However, large tracts of upland forest managed for bobwhites can be very productive. Proper pine forest management on a large scale offers some of the greatest opportunities to increase bobwhite habitat and populations in many areas of Mississippi.

Several habitat management tools are available to create or enhance bobwhite habitat in pine forests. Reducing tree density is the first step in developing the grass and forb ground cover bobwhites and other grassland wildlife require. Most pine forests in the Southeast do not support bobwhite because they are too heavily stocked with trees that form a closed canopy. Thinning reduces stem density and

opens the forest canopy, letting more sunlight reach the ground and stimulating growth of ground-layer vegetation.

In Mississippi most species of pines can be commercially thinned for the first time at 13 to 18 years of age, depending on the site. Basal area, or the total cross-sectional area of wood in the stand, is relatively easy to measure and relates well to herbaceous ground cover in forest stands. Typical timber thins reduce basal area to about 70 square feet/acre, but thinning stands to a basal area of 50 square feet/acre or less produces better bobwhite habitat. If bobwhite habitat is a greater priority than timber production, a basal area as low as 30 square feet/acre produces best habitat. In most cases periodic thins are necessary to maintain lower basal areas as trees continue to grow after each thin. Individual landowner objectives vary, so consultation with a registered forester and a wildlife biologist can help determine the best balance that meets both wildlife and timber objectives.

Just as thinning stimulates growth of grasses and forbs, it also favors growth of hardwood brush and trees that shade out desirable grasses and forbs if left unmanaged. Prescribed fire on a two- to three-year rotation is the most cost-effective tool to control undesirable brush invasion. When fuel conditions are appropriate for burning, thinned pine stands should be prescribe-burned during winter to early spring. Prescribed burning should always be conducted by a certified prescribed burn manager, who will develop a written burn plan and get permits before burning. Check with the Mississippi Forestry Commission office for more information about prescribed burning regulations. If prescribed fire is not an option, light disking on a two- to three-year rotation between thinned trees during fall or winter is an alternative for relatively clean sites. Always be especially cautious when disking in woodlands to avoid damaging tree trunks and roots and to avoid personal injury or equipment damage.



Soil disturbance, such as prescribed fire or disking, enhances habitat quality for bobwhites and other grassland birds because it inhibits woody brush growth, promotes annual plant communities, reduces plant residue and increases bare ground in the forest floor. Plant communities that develop after fire or disking also produce quality food and cover for deer, rabbits, turkeys, and other wildlife. If soil is not disturbed, plant community composition changes over several years, and annual plants are replaced by perennial forbs and grasses and, eventually, woody plants. By planning soil disturbances on a two- to three-year rotation, you can manage plant succession to develop a complex of different habitats that meet the seasonal habitat requirements of a number of wildlife species. For example, first-year burn areas typically produce good bobwhite brood cover by reducing litter accumulation and stimulating growth of annual plant communities that are rich in insects, whereas areas that have not been burned for two to three years provide better nesting cover because these areas will have more perennial grass and litter cover for building and hiding nests.

You can develop a rotational burning plan by creating 30-acre or smaller burn units and burning half to a third of these units one year, another half to a third the next year, and so on. Thus, you only burn a given unit every two to three years, but you burn some portion of the property each year. You can develop a rotational disking plan similarly. Disk a half to a third of suitable areas each year in a rotational way so you disk all suitable areas every two to three years.

Often, fire has been kept out of pine stands for so long that you can no longer control invasive hardwood species with low-intensity prescribed fires or disking. After thinning pine stands, if hardwood tree species dominate the ground or middle-canopy vegetation layer, you may have to treat these stands with a selective herbicide such as Imazapyr (such as Arsenal AC®).



*Thinned pine stand that was not managed with selective herbicide or prescribed fire.*



*Thinned pine stand managed with selective herbicide and prescribed fire.*

You enhance chemical control of invasive hardwoods when you use prescribed fire in the dormant season after applying herbicide (wait at least 6 months after application before burning for greatest herbicide effectiveness). Once you control these hardwood species with herbicide, future fire or disking treatments on a two- to three-year rotation should provide better control of hardwood invasions.

With some planning, you can protect some mast/fruit producing hardwoods and shrubs (such as wild plum, dogwoods, and oaks) from prescribed fire and herbicide treatments. These scattered hard and soft mast producing trees and shrubs can provide food and cover resources for bobwhites and other wildlife.

You should control invasive, non-native vegetation (for example, kudzu or cogongrass) in forest stands with herbicide treatments. Herbicidal control of all types of invasive vegetation is more economical and effective if you treat invasive species when they first appear. Contact a



*woodland strip disking*

wildlife biologist or forester to develop a plan for controlling invasive vegetation. Cogongrass, especially, is extremely invasive and seriously harmful to native plants and wildlife habitat. Landowners should learn to identify this invasive species, and if they find any, they should work to control it. For more information about detecting and controlling cogongrass, contact one of the agencies listed in the “Technical Assistance” section on the back cover of this publication or the Mississippi Department of Agriculture and Commerce (<http://www.mdac.state.ms.us/index.asp>), Bureau of Plant Industry, Plant Pest Programs, Mississippi State, MS 39762-5207 (662.325.7765).

A good way to produce more grassland wildlife habitat in forestland is to create forest openings. For bobwhites, 10 percent or more of forested acreage should be maintained in early successional openings. You can create these in established woodlands by clear cutting one- to five-acre patches throughout forest stands. You can easily create openings during commercial thinning of pine stands. Plan ahead and have a forester mark out forest openings when marking timber for thinning.



*“A good way to produce more grassland wildlife habitat in forestland is to create forest openings. For bobwhites, 10 percent or more of forested acreage should be maintained in early successional openings.”*

For mid-rotation pine plantations, you can create interconnected forest openings in a hub-and-spoke design. The hub-and-spoke opening has a central opening (hub) with open lanes (spokes) radiating through the pine stand, like a wagon wheel. You can create hub-and-spoke openings by removing several adjacent rows of trees when you thin a pine plantation. Hub-and-spoke lanes should be at least 30 feet wide to maintain grassy cover for bobwhites. The maximum width of lanes depends on how much timber acreage you are willing to remove from production (generally, the wider the lanes, the better). You can also use hub-and-spokes as fire breaks for prescribed burning of mid-rotation pine stands.

You can also develop forest openings by widening or heavily thinning woodland roadsides and keeping log-decks or skid trails open. You can use forest openings for permanent or rotational food plots planted to appropriate supplemental food crops. Openings can also be used as log-decks during later timber harvests. Use prescribed fire or disking on a two- to three-year rotation (described above) to manage forest openings.

#### *Supplemental Food Plantings*

Supplemental food plantings, or food plots, may not always be necessary, but food plantings may provide some critical food resources during late winter and early spring when food is most limited. For bobwhite management, you should favor hard seeded food plantings such as partridge pea, beggarweeds, or lespedezas (other than sericea). Leave grains such as corn and sorghum standing, so more seed will be carried on the stalk later into fall and winter.

In many cases you can produce important bobwhite foods without planting anything. As mentioned earlier, two very effective and affordable tools for bobwhite management are prescribed fire and light disking. Some sites have a good existing seedbank of forbs (especially legumes) and annual grasses that are



*“For mid-rotation pine plantations, you can create interconnected forest openings in a hub-and-spoke design.”*



*“Food plots may not always be necessary, but food plantings may provide some critical food resources during winter when food is most limited.”*



good bobwhite foods. After prescribed burning or light disking an area, a wildlife biologist can quickly determine whether a site has an abundance of natural food plants, or if enhancing the seed-bank through plantings is necessary.

A number of reseeding annual plants can be established to provide important bobwhite food. With proper management, these plants can be maintained for several years without replanting. Of all these plants, partridge pea and kobe lespedeza may be the most popular across the Southeast. Although these legume seeds are fairly expensive, it is important to remember that a single planting can provide food for several years if you manage stands with prescribed burning or light disking from fall to winter.

Where grain crops are grown, one way to provide bobwhites with supplemental food and cover is simply to leave a border of crop standing around the edge of a field. This is a cost effective way to provide a variety of agricultural foods, some of which can be difficult to cultivate in small patches because of intense deer browsing. Crop strips as narrow as 10 feet wide can provide a lot of bobwhite food on field edges. These strips will be more effective, though, if you leave them next to field buffers described earlier. If you lease lands for farming, you can have a contract developed to require the farmer to leave a small portion of the crop standing, typically in exchange for a reduced land rental rate.

Food plot size and shape are important because they influence the amount of edge around a plot, which occurs where different types of plant communities come together (such as where a forest is next to a field). Planting several small food plots, rather than a few large ones, and making those plots an irregular shape maximizes the amount of edge and thus make food plots more valuable for bobwhites.

Carefully consider and plan where to establish food plots. For example, the best food plots are next to areas with good escape cover, such as a plum or briar thicket. If you do not have escape cover, you can develop shrubby thickets next to food plots.

When establishing annual food plots, think about rotating food plot plantings each year and leaving part of the plot unplanted or fallow. In some cases, bobwhites benefit more from the native plant community in a fallow food plot than from the actual food planting itself. An example of this would be to establish strip plots of grain sorghum along the border of a grass field. The next year, leave that plot undisturbed and establish a similar strip plot beside the fallow plot. The soil disturbance created by preparing a good seedbed for planting encourages growth of many beneficial grass and weed species. Also, these fallow areas create a habitat that allows bobwhite chicks to move around freely and harbors plenty of insects for chicks to feed on.

More information on bobwhite food plantings is in Extension publication 2325, Supplemental Food and Cover Plantings for Bobwhite Quail in Mississippi (<http://msucares.com/pubs/index.html>). A wildlife biologist can also provide more information on managing food plantings for bobwhites.

### *Native and noninvasive, introduced plants for supplemental food plantings*

#### *Natives*

- Ragweed (*Ambrosia artemisiifolia*)
- Partridge pea (*Chamaecrista fasciculata*)
- Smooth ticktrefoil (*Desmodium laevigatum*)
- Stiff ticktrefoil (*Desmodium obtusum*)
- Florida beggarweed (*Desmodium tortuosum*)
- Roundhead lespedeza (*Lespedeza capitata*)
- Slender lespedeza (*Lespedeza virginica*)

#### *Introduced or cultivated*

- Kobe lespedeza
- Korean lespedeza
- Browntop millet
- Sorghum or milo
- Egyptian wheat
- Corn
- Soybeans
- Field peas (also called Cow peas)
- Sunflowers
- Wheat or oats and clovers (for bobwhites, plant clovers at 10 lbs/acre or less); cool-season planting, leave undisturbed throughout the summer



## Landscape-level Habitat Management

The kinds of habitats and resources bobwhites need must be developed at proper scales to maintain populations. Because bobwhites are not migratory, they need large portions of the landscape maintained in suitable habitat. Some science-based estimates suggest 2,000 to 4,000 acres of usable habitat is required to sustain viable populations in a given area. Relatively small (less than 1,000 acres), isolated land holdings managed for bobwhite can be productive habitat, and small acreages managed for bobwhite can help survival and reproduction. However, populations inhabiting small acreages are more susceptible to random environmental catastrophes (such as drought, ice storms, etc.), and processes such as gene flow and successful dispersal of individuals among populations may be minimal. Smaller properties managed for bobwhite habitat are more effective if several are managed within a mile of one another.

The figure on the right shows the concept of landscape-level habitat management. Each shape represents a landowner's property (acreage given inside the polygons) within the total 5,800-acre landscape. The green properties represent landowners who are actively managing for bobwhite habitat. The figure indicates 1,335 acres are being actively managed, which seems like a lot of habitat. However, when you look at the whole landscape, it is clear these are relatively isolated "islands" of habitat.

Assume some landowners next to green habitat management properties have also gotten involved in bobwhite management through local promotional efforts or habitat initiatives. The brown properties represent additional properties managed for bobwhite habitat. The amount of managed property has more than doubled (2,724 acres managed), and now much more interconnected habitat makes it easier for bobwhites to move between managed properties.

This illustration is very simple, since population response is a function of the quality and quantity of habitat and whether or not there are existing "seed" populations of birds in the landscape. However, it demonstrates the concept of "landscape-scale management" by positively affecting a large part of the overall landscape.



*pine woodland management*



*field buffers along row crop fields*



*edge feathering along the interface of woods and fields*

Since bobwhite populations respond better to management over several thousand acres, landowners with smaller acreages may want to consider working with a group of neighboring landowners to form a landowner wildlife management cooperative. A cooperative combines small acreages of neighboring landowners to create larger tracts of managed habitat (as illustrated by the landscape-scale management figure above). Forming a landowner cooperative requires that a group of neighboring landowners share common wildlife management goals and

*"Smaller properties managed for bobwhite habitat are more effective if several are managed within a mile of one another."*

effectively work together to achieve those goals. A good starting reference on developing a landowner cooperative is Extension publication 1637, *Wildlife and Forestry Landowner Cooperatives* (<http://msucares.com/pubs/index.html>). A wildlife biologist or registered forester may be able to provide more specific information on developing a successful landowner cooperative.

## Conservation Programs for Private Landowners

Before beginning management of a property for bobwhites, have a bobwhite habitat management plan in place. Agricultural producers can work with a wildlife biologist to develop a farm-wildlife plan that includes habitat management practices that are economical and practical for farm operations. Forest landowners can develop an integrated forest-wildlife management plan with a wildlife biologist and a registered forester to implement practices that accomplish both wildlife habitat and timber management objectives. Several conservation programs can assist private landowners with implementation costs of farm and forest wildlife management practices. You can find contact information for the agencies that administer each of these programs in the “Technical Assistance” section on the back cover of this publication.

Financial assistance for habitat management may be available through one or more USDA conservation programs. The Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), and Conservation Security Program (CSP) are available for landowners with eligible land uses. CRP, EQIP, and CSP are available to landowners with land in agricultural production; landowners managing forests for forest products such as timber are eligible for EQIP, but the property must meet criteria to be considered a farm. CRP provides conservation practices for field-level management. EQIP and CSP are more oriented toward

whole-farm management. Management practices available through EQIP depend on the county where a property is located. CSP is limited to producers in specific watersheds, and different priority watersheds are chosen for CSP every year. For landowners who have acreage enrolled in existing CRP grass (such as CP10) or forest (such as CP11) conservation covers, mid-contract management cost-shares are available for prescribed fire, herbicide application, and light disking. Contact the Farm Service Agency office for more information regarding CRP. For landowners interested in whole-farm management programs, contact the Natural Resources Conservation Service (NRCS) office for more information on EQIP or CSP.

The Wildlife Habitat Incentives Program (WHIP) is available to any private landowner. WHIP offers cost-shares for a wide variety of habitat management practices to develop bobwhite habitat in both open lands and nonindustrial private forestlands. Some of the practices WHIP cost-shares include prescribed fire, herbicidal control of invasive vegetation, native vegetation establishment, and forest regeneration. Contact the NRCS office about WHIP.

The Forest Resource Development Program (FRDP) is available to any non-industrial private forest landowner. FRDP provides cost-shares for forest management practices such as herbicidal control of invasive vegetation and forest regeneration. The Healthy Forests Reserve Program (HFRP) assists private landowners in restoring rare forest ecosystems (such as longleaf pine) through active management and stewardship. HFRP provides landowners with conservation easements and cost-shares for appropriate forest management practices. Contact the NRCS office about HFRP or the Mississippi Forestry Commission office for more information about and FRDP.

The Landowner Incentive Program (LIP) provides state wildlife agencies with



*“Several conservation programs can assist private landowners with implementation costs of wildlife management practices. Planning ahead helps accomplish specific management goals.”*

funds to enhance, restore, and protect imperiled habitats and benefit at-risk wildlife species on private lands. In Mississippi the longleaf pine region of the southeast, the Blackland Prairie of the northeast and central sections, and bottomland hardwood areas of the Delta were chosen as those of greatest conservation need under LIP. Mississippi's LIP will cost-share practices such as site preparation, prescribed burning, tree and native warm season grass plantings, and herbicide applications. Biologists from the Mississippi Department of Wildlife, Fisheries and Parks and Wildlife Mississippi provide technical guidance to landowners who participate in LIP.

Wildlife Mississippi also has prairie and longleaf pine restoration programs available to eligible landowners. Contact Wildlife Mississippi for information about their prairie and longleaf restoration programs.

Delta Wildlife provides technical assistance and cost-share for habitat development to landowners in the Delta region. Contact Delta Wildlife for information about their habitat management programs.

You can apply many of the same habitat management practices with each program, but there are differences in eligibility and financial incentives under each program. Depending on land uses, you may be able to apply a combination of conservation programs for greatest conservation and financial benefits. Remember, planning ahead helps accomplish specific management goals by applying a suite of programs and practices that accomplish management objectives and make the most financial sense.

## Population Monitoring and Harvest Considerations

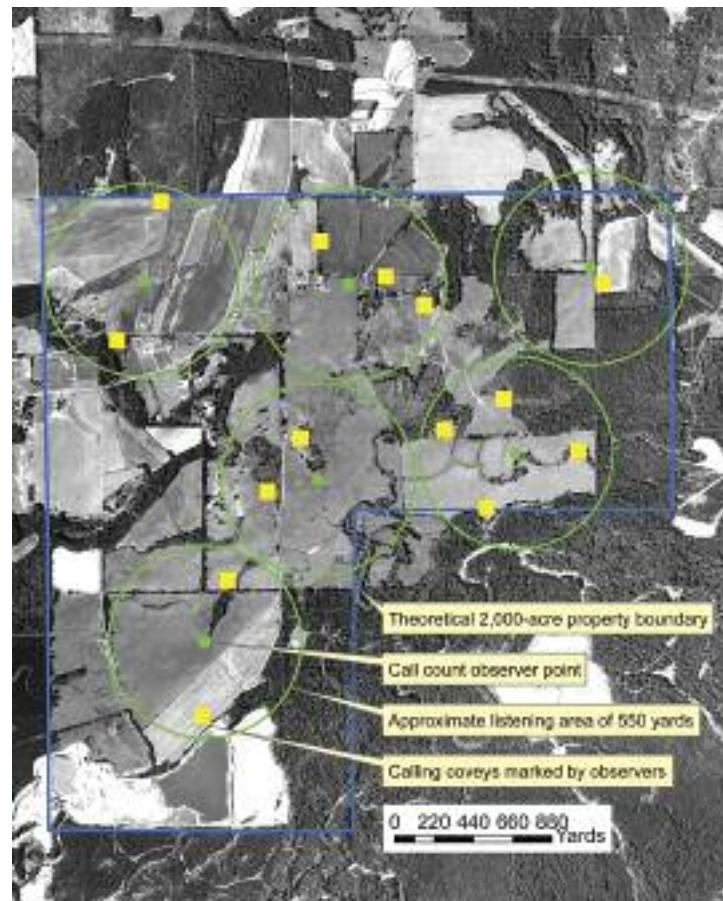
### *Fall Population Estimation*

Population monitoring allows you to evaluate the effectiveness of your habitat management program. You can use covey-call surveys to estimate fall bobwhite population sizes. Covey-call counts

should be conducted from mid October to mid November. The best calling period is usually during last two weeks of October. Covey-call counts should be conducted on days with little to no cloud cover or wind and high barometric pressure. Coveys typically call about 30 minutes before sunrise, and most coveys in an area start calling about the same time.

To conduct a covey-call count, get an aerial photograph or other type of map of the property where you can accurately determine locations to station observers. Having some copies of the map is also helpful to mark calling covey locations during the count. Distribute observer point locations around the property in places where observers can effectively hear calling coveys. Do not put survey points in areas that are not good bobwhite habitat or where there is a lot of noise (as in a closed-canopy pine plantation or along a busy highway). With practice, observers with good hearing can

hear calling coveys to a distance of about 550 yards (0.3 miles), which equals an effective survey area of about 200 acres. This hearing distance was estimated for relatively flat, open habitats – fields or open woods – and thus should apply to most areas managed for bobwhites in Mississippi. Space each call count observer point at least two times the estimated hearing distance (1,100 yards) from any other count point to reduce chances of more than one observer counting the same coveys.



It is best to survey all count points on the same morning (on smaller acreages, a couple of observers may be enough to survey all points). It is also a good idea to survey each point two to three different mornings, and use the average or greatest count of coveys at a given point for population estimates. On some larger properties, there simply are not enough observers to survey all points in a single morning. In this situation, survey the area in blocks each available morning based on number of available observers.

To use these covey counts to estimate bobwhite population sizes, flush as many coveys as you can find to estimate covey sizes, or you can assume that 12 birds is a reasonable estimate of average covey sizes. Once you estimate the average size of coveys, multiply the number of coveys you counted by the average covey size. This gives you an estimate of bobwhite population size. You can get more accurate estimates from covey-call surveys by adjusting for the proportion of coveys that do not call. More details and information on advanced applications of the covey-call count technique are available on the Tall Timbers Research Station website (visit <http://www.ttrs.org/> and follow the “Research Programs, Game Bird” link).

### *Harvest Management*

If you are interested in managing a property for hunting bobwhites, carefully consider harvest rates. After you make some estimates about bobwhite population sizes, you can decide how many birds to take during the hunting season. Some harvested birds would have died due to predation or bad weather, but others would have lived to the breeding season if not harvested. Thus, hunting can negatively affect populations if not carefully managed, because hunting almost always removes some birds that would have survived until the breeding season, with an opportunity to reproduce.

The best way to control harvest is to remove only a certain percentage of the

estimated fall population. For example, covey-call counts (using methods discussed previously) in October suggest population size is about 100 birds, and perhaps it is acceptable to the manager to harvest 20 percent (20 birds, including cripples) of this fall population. Assuming that 30 to 60 percent of the remaining birds were lost to other sources of mortality, a population of 32 to 56 birds would be carried into the breeding season. This is a somewhat simplified scenario, as some birds will move in and out of the population.

In the Southeast, managers should limit harvest to no more than 20 to 25 percent of the fall population as a general rule. If the surrounding landscape is more favorable to bobwhites, you may allow more liberal harvests in the 20 to 25 percent range. If a given property is essentially an “island” of bobwhite habitat surrounded by relatively unfavorable habitat, you should harvest more conservatively.

### **Summary**

Bobwhites thrive in habitats characterized by native grasses, forbs, and scattered shrubs. Historically, annual burning of fields, grasslands, and open pine forests, along with associated moderate livestock grazing and cropping, provided the right patchwork or “mosaic” of early successional habitats that bobwhite and other grassland wildlife required. As human activity once accidentally created optimal habitat for bobwhites, changes in the ways people use lands have contributed to declining bobwhite habitat quality. Millions of acres of small agricultural fields that once provided nesting, brood-rearing, and protective cover for the bobwhite have been converted to less favorable land uses such as intensive agricultural production, closed-canopy forests, and urban development. By understanding the various aspects of a bobwhite’s life and seasonal habitat needs, it is easier to understand how to apply management tools and prescriptions to produce desirable bobwhite habitat.



Open lands, including agricultural habitats, Conservation Reserve Program grasslands, and nonagricultural grasslands are often the easiest habitats to manipulate for bobwhite management because of the relative ease of developing grassy cover and because existing bobwhite “seed” populations are usually associated with these habitats.

Bobwhite habitat in open lands can be enhanced by developing suitable idle habitats, conversion of non-native, invasive grasses such as fescue and bermudagrass to native warm season grasses and forbs, rotational fallow field crop management, establishment of native grass and forb field buffers around edges of crop fields, and edge feathering. Strip-disking and prescribed fire are useful tools for managing native grass stands for bobwhite habitat. Although dense infestations of woody brush in grass fields are undesirable, creating and protecting some scattered patches of shrubby cover is desirable. Actively managing habitats maintains the combination of plant communities that meet bobwhite seasonal habitat requirements.

Forestland may be more difficult to manage for bobwhite habitat, especially if bobwhite populations have been absent for some time, but large tracts of managed upland forest can be productive bobwhite habitat. Proper pine forest management on a large scale offers some of the greatest opportunities to increase bobwhite habitat and populations in many areas of Mississippi. Habitat management tools used to create or enhance bobwhite habitat in forestlands include thinning to reduce tree density, creating forest openings, regular soil disturbances (prescribed fire or disking) to maintain grassy ground cover conditions, and selective herbicide as necessary to control hardwood brush invasions.

Supplemental food plantings or food plots may provide some critical food resources for bobwhites in late winter and early spring when food resources become limited. In some cases, bob-

whites benefit more from the native plant community in a fallow food plot than from the food planting itself. Once you determine the number, size, shape, and location of food plots, you can select the types of plants to propagate.

The seasonal habitats bobwhites require need to be developed at the right scale to maintain populations. Relatively small (less than 1,000 acres), isolated land holdings managed for bobwhite can be productive habitat, and smaller acreages managed for bobwhite might have locally positive effects on survival and reproduction. However, smaller habitat areas are probably more effective if several land holdings within a mile of each other are managed for bobwhite habitat. Since bobwhite populations respond more effectively to management over several thousand acres, landowners with smaller acreages may want to consider working with a group of neighboring landowners to form a landowner wildlife management cooperative.

Consult with qualified natural resource management professionals (such as wildlife biologists and registered foresters) to develop a comprehensive resource management plan. Several conservation programs are available to landowners seeking financial assistance to develop bobwhite habitat. Working with natural resource management professionals can make it easier to determine program eligibility and select conservation programs that accomplish your resource management objectives.

Finally, understanding bobwhite population dynamics and harvest management helps prevent poor resource use decisions. Carefully managing bobwhite harvest helps ensure long-term bobwhite population sustainability.

## Sources of Information

The following websites or offices have additional publications and information about bobwhite and other wildlife management:

Delta Wildlife – <http://www.deltawildlife.org/>

Mississippi Department of Wildlife, Fisheries and Parks – <http://www.mdwfp.com/>

Mississippi State University Extension Service – <http://msucares.com/> (You can get many wildlife and forest management publications by visiting the website or your county Extension office.)

Mississippi State University Natural Resources Enterprises – <http://www.naturalresources.msstate.edu/> (You can get many wildlife and forest management publications by visiting the website.)

Quail Forever – <http://www.quailforever.org/>

Quail Unlimited – <http://www.qu.org/>

Wildlife Mississippi – <http://www.wildlifemiss.org/>

## Technical Assistance

The following agencies are available to provide wildlife and forest management planning or technical assistance:

Mississippi Department of Wildlife, Fisheries and Parks  
Website: <http://www.mdwfp.com/>  
Phone: 601.432.2400

Delta Wildlife, Inc.  
Website: <http://www.deltawildlife.org/>  
Phone: 662.686.3370

Wildlife Mississippi  
Website: <http://www.wildlifemiss.org/>  
Phone: 662.686.3375

Mississippi Forestry Commission (MFC) has foresters to assist landowners with forest management planning.  
Website: <http://www.mfc.state.ms.us/>  
Phone: 601.359.1386

Mississippi State University, Wildlife and Fisheries Extension  
Website: <http://msucares.com/>  
Phone: 662.325.3174

Mississippi State University, Forest and Wildlife Research Center  
Website: <http://www.cfr.msstate.edu/fwrc/>  
Phone: 662.325.2952

USDA-Farm Service Agency administers the Conservation Reserve Program.  
Website: <http://www.fsa.usda.gov/>  
Phone: 601.965.4300

USDA-Natural Resources Conservation Service has wildlife biologists and foresters to assist landowners with wildlife and forest management planning.  
Website: <http://www.ms.nrcs.usda.gov/>  
Phone: 601.965.4339

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# Strip Disking and Other Valuable Bobwhite Quail Management Techniques



The bobwhite quail (northern bobwhite, *Colinus virginianus*), is one of the most exciting game birds in the Southeast. A covey rise of 12 or more birds in front of a dog's nose has increased the heart rates of thousands of bobwhite hunters over the decades that man has enjoyed this sport.

For the past several decades, though, bobwhite numbers have been declining, and for the last 10 years, population declines have been as much as 7 percent per year in certain places. Changing land use practices and habitat conditions (food and cover problems) account for most of the downward trend in bobwhite numbers, but other factors, such as predation, disease, and environmental toxicants may play significant roles. In parts of the South, where bobwhites have been managed intensively, bird populations have remained stable, which indicates the bobwhite quail can be managed successfully if you use proper techniques to create essential habitats.

## Habitat Requirements

In the southeastern United States, bobwhite are closely tied to early successional plant communities. Early successional plants are the annual weeds, grasses, and shrubs that develop in the first several years after some kind of disturbance. The disturbance may be a disking, fire, cultivation or fallowing, or such.

Bobwhites have specific habitat requirements that vary seasonally according to environmental and biological processes. Various stages of the agricultural/fallow/idle old-field cycle meet different seasonal habitat needs of bobwhites. For example, they nest in idle native grasslands (broomsedge field), raise their broods in weedy areas, and use low shrubby cover for protection from predators and weather. Habitat



management programs for bobwhites should create and maintain each of these plant communities that meet specific seasonal habitat needs. In the past, bobwhite were an accidental byproduct of forest and agricultural management practices. However, in modern landscapes, restoration of bobwhite populations requires intentional management.

### Habitat Management

Planned periodic disturbance is the key to creating and maintaining bobwhite habitat. Because of the long growing season, fertile soils, and abundant rainfall in the Southeast, undisturbed agricultural lands can rapidly develop into dense young forests not suitable for bobwhites. Management practices that are beneficial for bobwhites generally involve setting back plant succession to very early stages, similar to those found in fields one or two years after cultivation. In the South, habitats, whether open fields or wooded areas, that are allowed to grow up longer than three to four years without some type of soil or vegetative disturbance quickly grow out of good bobwhite habitat.

Typically, management practices for open fields include prescribed burning annually or every two years, bush-hogging, disking, planting agricultural crops, and protecting some areas that grow up into brushy escape cover. For wooded areas, the same management practices apply, but concentrating on opening up or daylighting canopies by selective thinning or clearcut timber harvests (to encourage understory plant growth) is important. Prescribed burning on a one- or two-year rotation is critical in pine forests for controlling the leaf and needle litter layer and hardwood understory and for promoting growth of legumes.

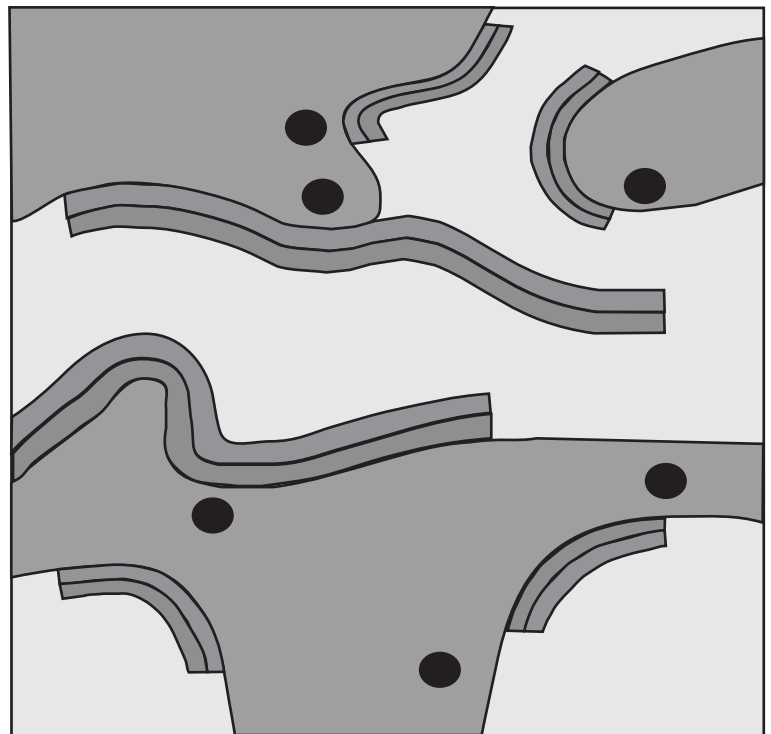
Bobwhite thrive in complex landscapes that resemble a patchwork of small crop fields, old fields, grasslands, and brush. Mixing different habitat types (nesting, broodrearing, feeding, or escape cover) close by is a must. Small patches


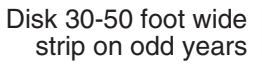

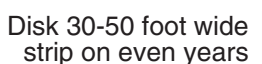

of various habitat types, such as brushy fence rows and ditch banks, should be left within cropland or old-field areas. Small woodlots should be bordered by transition zones of brushy cover that gradually fades into an opening or field. Artificial brush piles or windrows can be placed in large fields to break them into smaller units and increase habitat diversity. The goal is to create a patchwork of types, well interspersed. This interspersion of patch types increases the proportion of the landscape bobwhites can use.

### Strip Disking

Although bobwhite populations have declined, many landowners in the Southeast have significant opportunities to create habitat and restore populations. Hundreds of thousands of acres of old fields and young forests may provide excellent bobwhite habitat. But many of these habitats are in poor shape for bobwhites because they have grown up into thickets of less desirable grasses and brush that are too dense for birds to use. Many don't have a desirable plant mix.

Bobwhites like to have their feet touch bare ground because this makes it easy for them to feed on seeds and insects. The key to bobwhite management



	Native woods		Disk 30-50 foot wide strip on odd years
	Artificial brushpiles or half-cut trees bent to the ground		Disk 30-50 foot wide strip on even years
	Native herbaceous vegetation		



is a balance between a mix of bare ground that lets bobwhites feed and travel freely and vegetation that provides food, nesting habitat, and protection from predators.



Thick sod or dense vegetation that hinders bobwhite feeding can be renovated in old-field habitats with a tractor and disk. The technique simply involves disking strips through a field or open woods in the fall or spring. These strips should be 30 to 50 feet wide and separated by undisked strips of 60 to 100 feet. Disked strips should be as long as possible and should follow the contour of the land to prevent erosion. The undisked areas will provide nesting habitat, while the adjacent disked areas that later grow up into succulent forbs and legumes will provide habitat that is rich in insects and seeds.

Strip disking should be thought of as a rest/rotation system. After a year has passed, disk the previously undisked areas and let the previously disked areas grow for up to two years. This system develops a mix of vegetation that is zero to one, one to two, and two to three years old. Do not let areas get older than three years.

Strip disking enhances habitat quality in a number of ways, including releasing grass-bound fields, reducing litter accumulation, creating bare ground, stimulating germination of desirable seed-producing plants, and increasing insect populations by as much as four times. It will maintain nesting cover and produce adjacent brood habitat on a scale that will positively impact bobwhite populations. It will provide more insects and plenty of natural seeds at a much lower cost than planting food plots, although planting some of the strips to grains or legumes will further enhance habitat quality by providing additional winter food resources.

Although planting winter food resources is an important management tool and can enhance local habitat quality, vegetation succession management is the single most important aspect of bobwhite habitat management in the Southeast. Strip disking is an efficient and cost-effective vegetation management tool and should be broadly implemented to enhance bobwhite habitat quality.

As an example of successful strip disking, one Mississippi landowner kept records between 1987 and 1991 that show an increase in covey numbers from 16 to more than 100 partly because of switching to this management technique. Although not a cure-all for bobwhite quail, strip disking can be a valuable management technique that may help return the bobwhite to good population numbers.

### Conservation Reserve Program

Strip-disking is an approved management practice on grass fields enrolled in the Conservation Reserve Program (CRP). In fact, the USDA-Farm Services Agency will cost-share (50 percent) strip-disking on CRP as a mid-contract management practice. To qualify for this cost-share CRP contract, you must visit your USDA Service Center (USDA-FSA/NRCS office) and request that your CRP conservation plan of operation (CPO) be modified to permit strip-disking. For further information, see the USDA-FSA Mid-Contract Management Guidelines and USDA jobsheets MS-CRP-05 and MS-ECS-645-09.



Revised by **Dr. Wes Burger**, Professor, Department of Wildlife and Fisheries.

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## Pasture Management for Bobwhite Quail<sup>1</sup>

William M. Giuliano, James F. Selph, Emma V. Willcox, and Adam S. Willcox<sup>2</sup>

Like many agricultural practices, livestock grazing is often blamed for the loss and degradation of wildlife habitat, including that of bobwhite quail (Figure 1). However, in many rangeland systems, this is not necessarily the case, and grazing can actually be an effective habitat management tool. Fred Guthery, a Texas-Oklahoma quail biologist of more than 30 years, summed it up best when he said:

“No habitat management tool is more powerful than the cow. Give her a little salt, supplement and water, and she manages millions of acres of bobwhite cover. Like any powerful tool, she can be harmful or helpful, depending on how she's applied.”

Applied properly, grazing can create and maintain quality quail habitat, which includes small patches of nesting cover (warm-season, bunchgrasses such as bluestems), foraging habitat (weeds such as ragweed), and escape cover (shrubs such as saw palmetto) mixed among each other, like patches in a quilt. This is often referred to as the Crazy-Quilt and is necessary for healthy and abundant quail populations (Figure 2).



**Figure 1.** Bobwhite quail. Credits: J. Vanuga, USDA-NRCS, [www.forestryimages.org](http://www.forestryimages.org). (2003).

### Native Range

Whether it's pine flatwoods, cabbage palm-wiregrass prairie, or any other type of rangeland system, as grazing intensity changes, so does the plant community. From a cattle forage standpoint, native range in a pristine state, such as one with natural fire regimes and little or no livestock grazing, is considered “excellent.” Highly desirable and palatable native grasses, collectively called “decreasers” because they tend to decrease in abundance and distribution as grazing intensity

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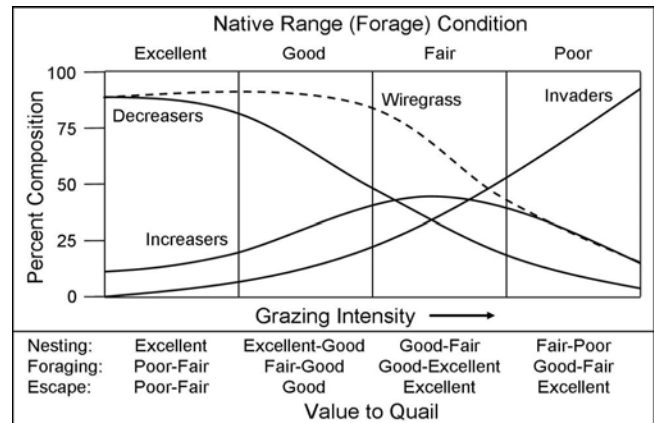


**Figure 2.** Healthy quail populations require small patches of nesting cover (bunchgrasses), foraging habitat (weeds), and escape cover (shrubs) mixed among each other, like patches in a quilt—often referred to as the Crazy-Quilt. Credits: W.M. Giuliano. (2005).

increases, typically dominate these systems (Figure 3). In Florida, these often include creeping and chalky bluestem, lopsided Indiangrass, switchgrass, and maidencane. Most rangeland systems in this condition typically have relatively few species of forbs (broad-leaved, herbaceous plants) and sparsely-distributed, low-growing shrubs. Some Florida rangelands are an exception to this general rule, because the dominant or co-dominant native grass is wiregrass, which may dominate the range in the absence of grazing, and maintains or increases its dominance with moderate levels of grazing. While these types of areas provide excellent nesting cover for quail, they are poor-fair in the foraging and escape cover necessary for abundant quail populations.

As grazing intensity increases, the preferred native grasses decrease in abundance, while less palatable grasses (such as broomsedge and bottlebrush threawn) and forbs, called increasers, become more abundant and widely distributed (Figure 3). Often thought of as weeds, many of these species produce and attract abundant and nutritious quail foods, such as seeds and insects, while providing excellent foraging cover and some escape cover. Certain legumes (such as partridge pea and beggarweeds) are particularly valuable increasers for quail because of their high protein content and associated insect communities. The increased soil disturbance from having more livestock hooves in an area may also improve soil conditions for these

“weed” species, accelerating their establishment. In addition to increases in these “weeds,” shrubs and woody vegetation (such as saw palmetto and wax myrtle), known as invaders, begin to proliferate as competition from native grasses is reduced by grazing (Figure 3). These types of plants are valuable for quail as escape cover from both predators and weather. Livestock grazing also reduces grass density and biomass in the area, improving conditions for quail. Dense vegetation, particularly at the ground level, can inhibit quail movements and reduce foraging efficiency and the quality of nest sites. Moderate levels of grazing typically lead to this more open and diverse rangeland community that produces the best quail habitat, and is considered good-fair condition, in terms of livestock forage.



**Figure 3.** In the absence of other land management practices (for example, prescribed burning of shrubs), increases in grazing intensity have relatively predictable effects on plant communities—decreasers such as chalky bluestem and lopsided Indiangrass decline in abundance; increasers such as broomsedge, many “weeds,” and wiregrass at first increase and then decline in abundance; and invaders such as saw palmetto continually increase in abundance. Moderate grazing intensities tend to lead to a mixture of plant types, providing for all of the bobwhite's habitat needs (nesting, foraging, and escape cover) and good-fair forage conditions for cows. Credits: W.M. Giuliano. (2006).

When grazing intensity is heavy, livestock often eliminate the preferred native grasses (decreasers). As cattle turn to the less palatable grasses and weeds (increasers), including wiregrass and broomsedge, these also decline in prominence. And in the absence of fire and other control treatments, shrubs and woody vegetation (invaders) rapidly spread in an area. While this situation provides excellent escape

cover conditions and fair-good forage conditions for quail, it provides little or no nesting habitat and will result in low quail numbers. Lacking most grasses, these areas are also poor in forage condition for livestock (Figure 4).



**Figure 4.** Heavy grazing, when non-forage species are not being controlled through prescribed fire and other treatments, often removes native grasses and weeds, allowing shrubs such as saw palmetto to dominate the range. While this situation provides excellent escape cover conditions for bobwhites, it provides little or no nesting habitat and will result in low quail numbers. Lacking most grasses, these areas are also poor in forage condition for livestock. Credits: W.M. Giuliano. (2004).

Alternatively, heavy grazing, particularly when invaders are being controlled, may lead to the typical “golf course effect,” providing little forage for cattle and no food or cover for quail (Figure 5).



**Figure 5.** Heavy grazing, particularly when shrubs and other non-forage plants are being controlled, may lead to the typical “golf course effect,” providing little forage for cattle and no food or cover for quail. Credits: W.M. Giuliano. (2006).

Unfortunately for quail, many of our rangelands in Florida are in either excellent or poor forage condition. Excellent forage condition comes about through intensive range management (for example, overly frequent prescribed fire, herbicide use, and mechanical treatments) or lack of grazing. Poor conditions result from overgrazing and lack of fire. The ideal situation for quail exists with good-fair range conditions for cows, because this creates an environment that includes all that a bobwhite needs: food and foraging cover, nesting cover, and escape cover, all in small patches interspersed with each other—the Crazy-Quilt. The further we get from both excellent and poor range conditions for cows, the more quail the area can support. While only a moderate stocking rate can be applied and still maintain these ideal habitat conditions for quail, it does have advantages from a livestock management perspective. By maintaining moderate stocking rates and good-fair range conditions for livestock, ranchers avoid having to manage intensively the range. To sustain the heavy grazing necessary at high stocking rates, fertilization, prescribed fire, and mechanical treatments are necessary to maintain forage grasses and remove the less palatable increasers and invaders. In addition, healthy bobwhite populations, obtained only with moderate grazing intensities, can lead to increased hunting opportunities and the possibility of deriving income from quail harvests.

### Improved or Tame Grass Pasture

Much of the native rangeland in Florida is being or has been “Improved.” This may increase forage production for cows but makes most of the area unsuitable for quail. Typically, improvements include the eradication of native grasses, forbs, shrubs, and trees, and the establishment of large monocultures of exotic forage grasses such as bahiagrass. While some of these grasses, including bahiagrass, produce abundant seed that is used by quail, no single food can satisfy the nutritional requirements of bobwhites. Diverse plant communities produce a greater abundance and diversity of plant foods, as well as attracting a greater abundance and diversity of insect foods for quail. The eradication of forbs, shrubs, and trees also removes most of the foraging and escape cover for bobwhites. If the grass used in an improved pasture

is a bunchgrass that is similar to our native grasses in structure, it may provide good nesting habitat. However, given that foraging and escape cover are usually not present in the pasture, it will receive little or no use because the birds prefer to nest within a short walk or flight from feeding and escape cover (typically less than 200 feet). Therefore, most quail use of improved pastures occurs on the periphery, where birds have access to food and cover, reducing the total useable habitat for bobwhites and the overall number of birds on a ranch (Figure 6).



**Figure 6.** Most bobwhite use of improved or tame grass pastures occurs on the periphery, where birds have access to more abundant food and cover (particularly shrubs for escape), reducing the total useable habitat for quail and the overall number of birds on a ranch. Credits: W.M. Giuliano. (2005).

## How Do We Get There

Unfortunately, there is no magic stocking rate or number of animal units that will always provide moderate grazing intensity and the Crazy-Quilt that bobwhites need. How many animals are needed, how long they graze, how often are in an area, and at what time of year, are all factors that need to be considered; and all will change from one pasture to the next, and even within large pastures due to differences in soil conditions, vegetation, and climate. This is further complicated by other management activities that affect plant communities, including prescribed fire, mechanical treatments such as roller-chopping, herbicide applications, and fertilization. All is not lost, however, as most experienced range managers can predict grazing impacts of various stocking rates given normal conditions.

Although very little is known about the impacts of grazing on bobwhites in Florida, studies of quail in other rangeland systems and on similar species within the State tell us several things:

- All other things being equal, rotational grazing is better for bobwhites than continuous grazing. In pastures without cows, birds and nests will not be disturbed and vegetation will have a chance to grow, providing better food and cover. Even a simple system, where animals are rotated off native range prior to nesting season (early spring) and put on tame grass pasture, will benefit quail. Except for the periphery, little or no nesting occurs in large tame grass pastures, so putting cows in these areas has little impact on bobwhite populations. However, even on poor native range, removing cows will reduce disturbance and allow vegetation to regrow, providing foraging, escape, and nesting cover.
- Higher site productivity means that more animal units can be supported while keeping grazing intensity and impacts moderate. So, better soils and climate can mean more cows and quail.
- Shorter duration grazing on an area is better for bobwhites because it minimizes the time cows are disturbing birds and allows more time for plant growth.
- The less often an area is grazed, the better it is for quail because it minimizes the frequency of cows disturbing birds and allows for more time of plant growth.
- Timing grazing in an area to avoid the nesting season, allow plant regrowth prior to nesting, and produce seeds for food can benefit bobwhites.

Other practices can also be employed to enhance pastures, both native and tame, for quail:

- *Mobile Heavy Spot Grazing*—Either temporarily fencing livestock in small areas, or attracting dense concentrations of animals to water sources, salt, supplements, hay, or recently burned areas will lead to intense disturbance of the soil, overgrazing, and excessive nutrient

(feces) inputs. If done for at least a couple of months, this will greatly defoliate and often kill all the vegetation in the area, including most tame forages such as bahiagrass. When this intense disturbance is removed, an abundant and diverse weed patch will form providing excellent foraging habitat as well as nesting and escape cover. By moving such sites around large pastures, excellent bobwhite habitat can be created.

- *Strip Improvements*—Rather than converting (improving) entire pastures from native to tame pasture, improve 100–200-yard-wide strips that alternate with native range. This will create more edge on tame sites, the only areas typically used by birds, and leave more native range in the area, which is better quail habitat.
- *Exclosures*—Temporarily fence small areas within large pastures to exclude livestock. Abundant and diverse weed patches will form in the areas, providing excellent foraging habitat as well as nesting and escape cover. By moving such sites around large pastures, excellent bobwhite habitat can be created.
- *Fences*—Let the weedy and shrubby vegetation grow along pasture boundary fences. Abundant and diverse weeds and shrubs will form in the areas, providing excellent foraging habitat as well as nesting and escape cover. These areas will also serve as protected, travel corridors that allow quail to move safely between different parts of the ranch.

All of these practices will increase the plant species and structural diversity, and patch interspersion in pastures, making a more quilt-like community.

Ironically, “improving” pastures for cows through intensive management, and converting native vegetation to tame grass pasture is not an improvement at all for the bobwhite. However, there are techniques, even for tame grass pasture, that benefit quail and will allow cows and quail to coexist—the key is to create and maintain a Crazy-Quilt (Figure 7).



**Figure 7.** Livestock and quail can coexist on Florida's pastures rangelands. In fact, applied properly (that is at moderate intensities), grazing may be the best tool to create the Crazy-Quilt habitat necessary for healthy and abundant quail populations. Credits: W.M. Giuliano. (2005).

# Field Borders



# WILDLIFE TRENDS

March/April 2005

Volume 5, Issue 2

## Conservation Buffers

By: *Wes and Leslie Burger*

The long-term success of wildlife populations in the Southeastern United States is largely in the hands of private landowners. Nearly 80% of the total land base in the Southeast is privately owned forests, agricultural lands, and rural properties. As demand for food and fiber products has increased and technology advanced, agricultural practices have intensified. The result has been farm consolidation and larger fields, monocultural production, loss of idle fields, conversion and loss of native grasslands and wetlands, and reduction in overall landscape diversity. In other words, the environment has been simplified and there



*A native warm season grass field bordering a soybean field provides nesting and brood rearing cover during the breeding season, increases usable space and supports winter grassland songbirds. Photo courtesy of USDA-NRCS.*

## WILDLIFE TRENDS

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In This Issue

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are now fewer places for wildlife to exist and thrive. In response to these land use changes, an entire suite of early successional wildlife species is slowly disappearing from the landscape. Among these species is the northern bobwhite which has declined by more than 70% (3.8%/year) over the last 3 decades.

However, many agricultural producers value wildlife and are interested in improving wildlife habitat on their properties, if the management practices can be implemented without compromising their agricultural production goals. Agricultural producers are the stewards of our working lands. Conservation practices that are easily integrated into production systems, achieve multiple environmental benefits, enhance wildlife habitat and improve whole-farm profitability are most likely to be adopted by producers. Conservation buffers uniquely meet these criteria. Conservation buffers are narrow strips of land maintained in permanent vegetation designed to trap pollutants, reduce water and wind erosion, and provide other environmental benefits, including wildlife habitat. The National Conservation Buffer Initiative, launched in 1997 by the USDA, encourages the use of conservation buffers by agricultural producers and other landowners. This initiative utilizes USDA conservation programs to assist landowners in developing or enhancing wildlife habitat using cost shares and incentive payments to offset direct costs or lost revenue associated with changes in production systems.

### **Conservation Buffers**

Conservation buffers are a suite of management practices that can be implemented individ-

ually or in concert with other buffer or agricultural practices, including conservation tillage, nutrient management, and pest management. There are many kinds of conservation buffers including: filter strips, riparian corridors, shelterbelts, grass waterways, contour grass strips, alley cropping, vegetation barriers, and field borders. Each of these buffer types accomplishes specific objectives such as: soil erosion reduction, herbicide retention, water quality improvement, and wildlife habitat provision. The environmental benefits of a buffer will change in relation to its type, surrounding landscape, hill slope position, vegetation structure, and management.

Conservation buffers, particularly forested riparian buffers along streamsides, improve water quality and aquatic habitat by reducing soil and agri-chemical runoff, stabilizing creek banks, and reducing water temperatures. They also provide important nesting, feeding and protective cover for birds and smaller mammals. Similarly, alley cropping and windbreaks, narrow strips of trees that border fields or divide larger fields into small units, provide reduction in wind erosion and comparable wildlife benefits. Conservation buffers provide



*Riparian buffer and herbaceous buffer along drainage ditch intercepts agrichemicals, stops erosion and improves water quality. Photo courtesy of Haren Brasher, MSU-FWRC.*

travel corridors, linking patches of similar habitat and facilitating movement of animals through inhospitable landscapes.

Although riparian buffers that include trees, shrubs and grass likely provide the greatest multiple environmental benefits, gains in soil erosion reduction and water quality can also be accomplished with grass filter strips, waterways, and contour strips. Four-meter-wide grass strips, regardless of plant species, have been shown to reduce herbicide leaving fields by 66-95%. The type of grass species does, however, substantially affect wildlife habitat value. Sod-forming grasses such as Kentucky Tall Fescue and Bermuda grass have been traditionally used for erosion control, but their dense structure is not nearly as beneficial to wildlife as native warm season grasses, such as Eastern gama grass, big bluestem, little bluestem, Indian grass and switch grass.

Management practices also influence wildlife habitat value. For example, frequent mowing will diminish wildlife value, whereas periodic burning (2-3 year rotation) can enhance wildlife value.

### **Buffer Function and Position**

The various types of conservation buffers should be located in different positions in the field, depending on what function or purpose the buffer is to serve. For example, riparian buffers and grass filter strips are usually used on the down slope side of crop fields, adjacent to rivers, streams, or lakes. Their primary purpose is to retain sediments and herbicides and improve water quality. Grassed waterways, terraces, and contour strips are placed within the field, relative to topographic or drainage features. They are designed to slow and direct



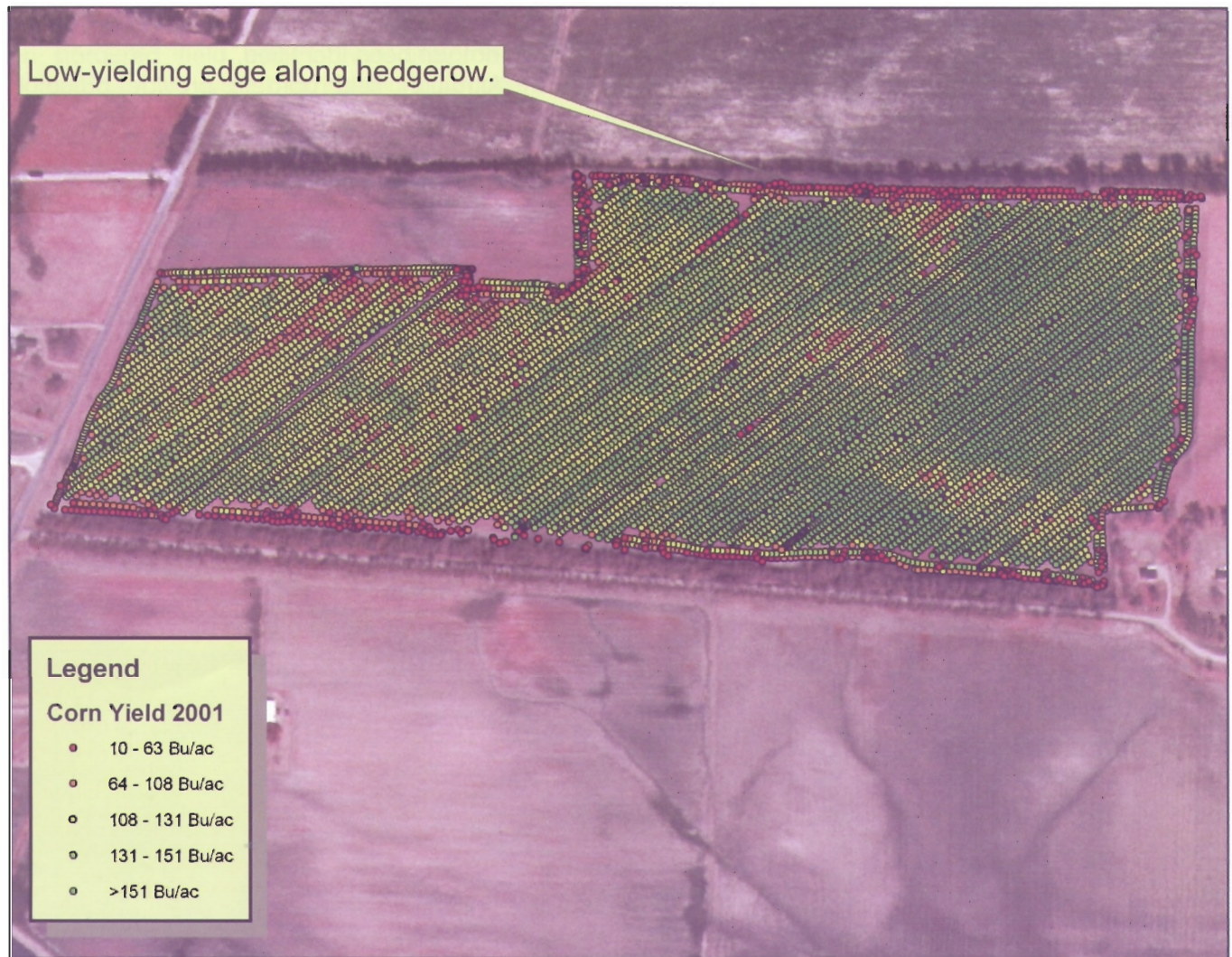
*Herbaceous field border dominated by ragweed provides excellent brood habitat during the breeding season and cover and food during the fall and winter. Photo courtesy of Wes Burger, MSA-FWRC.*

water flow, trap sediments, and reduce erosion. In contrast, field borders are designed primarily for wildlife habitat and can be used around the entire field edge. A field border consists of 20-150' wide strips of idle, herbaceous vegetation maintained between the crop and adjacent non-crop habitat. Field borders may also make good economic sense. Research in North Carolina and Mississippi has shown that field borders can replace low-yielding field margins with a subsidized conservation practice, increasing overall economic return. Use of GPS-equipped yield monitors can help producers to identify poorly producing areas of a field. For example, figure 1 shows corn yield on one

Mississippi farm in relation to an adjacent wooded plant community and Figure 2 demonstrates the type of situation in which replacing a low yielding edge with a conservation buffer can increase farm profitability. Because creation of wildlife habitat is a primary function of field borders, the rest of this article will focus on field border benefits and design.

### **Wildlife Benefits of Field Borders**

Managed herbaceous field borders provide habitat for many farm wildlife species. For example, studies in North Carolina have shown that Northern Bobwhite were nearly 2 times



*Competition for sunlight, water and nutrients produces low corn yields adjacent to hedgerow. These areas are often negative profit regions if costs of production exceed return. The producer can increase field and farm-level profits by taking these areas out of production and enrolling them in an incentivized conservation practice.*

more abundant on row-crop farms with field borders compared to farms without borders. Research in Mississippi demonstrated a 69% average increase in local fall bobwhite populations from converting as little as 5-6% of row crop acreage to field borders. On one 1600 acre working farm, a 6% change in land use (crop lands to field borders) resulted in a 16% increase in usable space for bobwhite. This disproportionate response occurs because the field border not only provides habitat but also increases the utility of adjacent croplands.

Wintering and nesting songbirds also respond positively to the habitat provided in field borders. In Mississippi, 53 bird species were documented using field borders during the breeding season. The most common species included Mourning Dove, Northern Cardinal, Indigo Bunting, Dickcissel, Red-

winged Blackbird, and Common Grackle. Dickcissel and Indigo Bunting were nearly twice as abundant on fields with field borders, as compared to fields with no borders. The herbaceous vegetation in field borders provides nesting, foraging, loafing, and roosting cover for these species. Numerous studies have shown that in agricultural landscapes, the density of bird nests in strip cover is very high relative to other available patch types, but the nest success for some species is quite low. Narrow buffers are easily searched by nest predators which tend to forage along edges. Ongoing studies are demonstrating that birds nesting in wider borders (90-150') have higher nest success than those in narrow field borders (10 - 30'), but an optimal or sufficient border width has not yet been identified.

Although field borders provide breeding



Example of a low-yielding area next to a stream corridor that the producer removed from production and enrolled in CCRP CP22 riparian buffer.

season habitat for some songbird species, their greatest value may occur during winter. During winter, herbaceous communities in the Southeast provide important wintering habitat for numerous short-distance grassland migrants, many of which are exhibiting regional declines. A North Carolina study demonstrated that crop fields with conservation field borders supported substantially greater abundance of wintering sparrows than adjacent fields with mowed field margins. One Mississippi study documented 71 different bird species using field borders during winter. In this study, the most abundant species were Red-winged Blackbirds, American Pipits, Song Sparrow, Savanna Sparrow, and American Robins. Winter sparrows were 9-times more abundant on bordered field edges than unbordered. Song Sparrows were 6-times more abundant and Savanna Sparrows were 2-times more abundant on bordered field edges. During winter, the annual weeds in field borders provide food for seed-eating birds and the vertical structure provides roosting and thermal cover.

### Field Border Establishment

Field borders can be created by planting a native grass community or by seeding a cover crop and allowing natural succession to revegetate the area. The least expensive method of establishing field borders is to plant a fall, small grain cover crop (wheat or oats), over-seed with a legume in winter (lespedeza, partridge pea, etc.), then allow the plant community to succeed naturally. On most sites in the Southeast, this combination will produce a diverse native community of broomsedge, legumes, and broad-leaved forbs within 2-3 growing seasons. However, if the producer has access to a native grass drill, a prairie grass community can be established within 1-2 growing seasons by drilling a mixture of big-bluestem, little bluestem, Indian grass, and switch grass. Inclusion of native legumes (partridge pea, Illinois bundle flower, etc) and wildflowers (Maximillian sunflower, cone flower, Liatris, black-eyed Susan, etc) will enhance the visual appeal and wildlife value. Regardless of the



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establishment method, periodic management will be required to maintain an early successional plant community. Woody vegetation should be controlled with periodic disturbance, such as disking or prescribed fire, but not during the growing season.

### **Programmatic Assistance**

Numerous USDA conservation programs can assist producers and landowners with installation of conservation buffers. Conservation buffers can be cost-shared under the Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Wetlands Reserve Program (WRP), and Conservation Reserve Program. However, the programmatic "workhorse" for conservation buffers is the Continuous Conservation Reserve Program (CCRP). CCRP provides cost-share and incentive payments (Signup Incentive Payments, Practice Incentive Payments, and annual rental payments) for a diversity of buffer practices, and unlike regular CRP the land does not need to be highly erodible (HEL) to be eligible. Furthermore, under CCRP eligible land can be enrolled at any time instead of simply during a short enrollment period (hence the name "continuous"). Cropland is eligible for the CCRP if it was planted or considered planted to an agricultural commodity in 4 of the 6 years between 1996 – 2001. Additionally, certain marginal pastureland is eligible for some CCRP practices. Individual CCRP cover practices (CP) are designed to achieve specific environmental benefits and eligibility varies among CPs. For example CP21 Grass Filter Strips and CP22 Riparian Forest Buffers are designed to be used on the down slope side of fields adjacent to a perennial stream, ditch, or water body. CP5 Field Windbreaks, CP8 Grass Waterways, CP15 Contour Grass Strips, and CP16 Shelterbelts are implemented within fields. In August 2004 USDA announced the availability of a new CCRP practice called CP33 Habitat Buffers for Upland Wildlife. This practice provides incentives and cost-share to establish 30 – 120' native grass and legume buffers around row crop fields. Incentives include \$100/ac

Signup Incentive Payment, an annual per acre rental payment, 50% cost-share on establishment costs, and 40% Practice Incentive Payment on establishment costs. CP33, in particular, provides a tremendous programmatic tool for creating wildlife habitat in agricultural landscapes. For more information on these programs, contact your local USDA Service Center or see <http://www.fsa.esda.gov> or <http://www.nres.usda.gov>. Landowners and producers will achieve greater wildlife benefits from federal farm programs if they work with a knowledgeable wildlife biologist to develop a comprehensive farm conservation plan with wildlife as a specific objective.

Conservation buffers are common-sense conservation practices that provide landowners and producers with tremendous flexibility and incentive to develop a conservation cropping system that meets production objectives, improves environmental quality, enhances wildlife habitat, and helps farmers be good stewards of our natural resources.

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*Leslie Burger has B.S. and M.S. degrees in Biology from Murray State University and University of Missouri, respectively. She has conducted field research from the Galapagos Islands to Hudson Bay, and several places in between. She has held professional positions with the Missouri Department of Conservation as an assistant research biologist and Vertebrate Ecologist. She currently works full time home schooling the Burger's 3 sons.*

# Grassland Bird Response to Agricultural Field Borders



RESEARCH ADVANCES  
Forest & Wildlife Research Center



In the Southeast, privately owned rural lands constitute almost 80% of the total land base with timber and agriculture as the primary land uses. Consequently, the health of wildlife populations in the Southeastern United States is largely determined by the land management decisions of private landowners. These privately owned forests and farmlands not only produce food and fiber products to meet growing global markets, they also provide essential habitats for hundreds of wildlife species.

However, increasing demand for food worldwide and advancing technology have resulted in dramatic intensification of agricultural practices and changes in our agricultural systems. Notable changes have included farm consolidation, larger field size, single-crop production, loss of idle non-crop plant communities, conversion of native grasslands to row crops or exotic forage grasses, and wetland loss. All of these factors have contributed to a reduction in overall landscape diversity, leaving fewer places where wildlife exist and thrive.

Agricultural producers are the stewards of some of America's most important natural resources and are often interested in enhancing wildlife habitat value if management practices can be implemented without compromising their agricultural pro-

duction goals. Enhancement of farmlands for grassland birds can be accomplished by incorporating conservation buffers as part of a comprehensive resource management system.

Conservation buffers are practical cost-effective conservation practices which provide multiple environmental benefits (increased herbicide and nutrient retention, reduced soil erosion) while providing habitat for grassland birds. Conservation buffers are vegetative barriers (grass, shrubs, trees) strategically located within or at the edge of crop fields to protect elements of the natural environment from effects of weather and human activities. Within intensive agricultural production systems, conservation buffers may be the only source of semi-permanent grassland habitat for nesting birds. Idle herbaceous field borders are one type of conservation buffer, but unlike other buffer practices, such as riparian buffers and filter strips, field borders can be deployed around the entire field margin, instead of just along down-slope edges. Field borders are intentionally managed non-crop herbaceous plant communities along crop field edges to provide environmental and wildlife habitat benefits. Field borders are often employed in addition to existing field edge habitats such as fence rows and drainage



ditches and may vary in species composition or width depending upon the objectives for their establishment.

Field borders may offer opportunities for enhancing farmlands for numerous grassland birds throughout the United States. Scientists in the Forest and Wildlife Research Center have extensively studied the use of field borders to enhance bobwhite quail habitat. However, little information is available on nongame grassland bird use of field borders. If field borders are to be implemented on a nationwide basis to enhance grassland bird habitat within agricultural production systems, as encouraged through many government sponsored conservation programs, information regarding grassland bird use of field border habitats is required. In this study, scientists measured the effects of field borders on populations of breeding and wintering grassland birds and northern bobwhite in the Black Belt prairie of northeastern Mississippi.

The studies were conducted on three privately owned working farms located within the Black Prairie physiographic region in Clay and Lowndes counties, Mississippi. Primary agricultural practices were rowcrop, forage, and livestock production. During early spring 2000, experimental field borders were established along agricultural field margins (fence rows, drainage ditches, access roads, and contour filter strips) on half of each farm. Across these farms an average of 6% of rowcrop field area was converted to field border habitats. This amounted to 1-2% of the land base of each farm.

Producers were paid a monetary incentive similar to those used in common USDA conservation buffer programs at the end of each growing season for land placed into field borders. Furthermore, producers were required not to mow, herbicide, or disk field borders during the duration of the study.

### **Grassland Songbird Response to Field Border Management**

Researchers measured summer and winter abundance and diversity of grassland birds relative to field border management practices during June-July 2002 and February 2002 – 2003.



*American Robin*

### **Breeding Season Songbird Response**

During breeding season surveys, 53 species of birds (1443 individual birds) were observed on experimental fields. The 6 most abundant species were Red-winged Blackbird (20%), Indigo Bunting (15%), Dickcissel (13%), Mourning Dove (8%), Northern Cardinal (7%), and Common Grackle (6%).

Dickcissel and Indigo Bunting were nearly twice as abundant where field borders were established, regardless of adjacent plant community type or width. Dickcissels and Indigo Buntings have been declining at 4 percent per year and 1.5 percent per year, respectively, during the previous 24 years in the Black Prairie region, so field border habitats may contribute to regional conservation. Although Indigo Buntings are primarily a forest bird, the field borders provided a herbaceous plant community along existing wooded edges making these areas more favorable for foraging, loafing, and nesting sites. Field borders provide vertical and horizontal vegetation complexity and may enhance the suitability of existing linear habitats (ditch banks, fencerows, road edges) for Dickcissels.

Species richness was greater along bordered than non-bordered transects, however diversity did not differ. Overall bird abundance was greater along bordered linear habitats than similar non-bor-

*Indigo Bunting*





*Northern Cardinal*

dered edges. However, addition of field borders along larger patches of grasslands or woodlands did not alter the number of birds using these edges. We speculate that in linear habitats characteristic of modern agricultural landscapes, field borders provided greater plant structure and diversity, thus supporting a greater number individuals and species. Although our results are based on 1 year of data, we believe that the magnitude of observed field border effects suggests that field borders may increase the abundance of selected species of grassland/shrub birds during the breeding season.

### ***Wintering Songbird Response***

During winter surveys, 71 species of birds were observed on experimental fields. Of the 17,562 individual birds, the 5 most abundant species were Red-winged Blackbird (45%), American Pipit (11%), Song Sparrow (7%), Savannah Sparrow (6%), and American Robin (5%).

Wintering sparrows were one group of birds that seemed particularly responsive to the presence of field borders. Many sparrow species breed on grasslands in the Midwest and winter in agricultural landscapes in the Southeast. Most sparrows are ground foragers and their use of linear habitats often depends on vegetation structure. Collectively, across most adjacent plant communi-

ties, we observed greater densities of Song, Field, and Swamp sparrows along bordered transects than non-bordered transects. Song Sparrow and Swamp Sparrow densities were greater where field borders were established along existing grasslands. Whereas the addition of herbaceous field borders adjacent to grasslands may seem redundant, most grasslands within our study farms were monotypic stands of cool-season, exotic forage grasses and provided little vertical structure and few quality food producing plants. Song Sparrow densities were also greater along field borders adjacent to wooded strip habitats than comparable wooded strips without a field border.

After crops were harvested, field border habitats provided suitable cover and food resources for many sparrow species. Field borders in our study were recently established (<3 years old) and consisted primarily of seed producing grasses and forbs coupled with a relatively open understory. This combination likely facilitated ground-based foraging. Additionally, field borders may provide escape cover in close proximity to foraging sites within the crop stubble. Therefore, we believe that field borders may enhance the value of existing grasslands and crop fields by producing additional foraging habitat and providing escape cover in close proximity to waste grain food sources.

### ***Northern Bobwhite Response***

Previous studies have demonstrated that field borders may increase forging efficiency of bobwhite chicks, use of rowcrop fields, breeding season survival, usable space, and local abundance. Although during our study autumn and breeding season bobwhite density at bordered and non-bordered farms were not statistically different, the average autumn density at bordered sites was about 66% greater and the average number of males during the breeding season was about 23% greater than non-bordered sites. These relative effect sizes were similar to those from previous field border studies. We evaluated the net effect of field borders on the proportion of the landscape usable by bobwhite by developing a space-use based habitat model constructed from utilization distributions of radio-marked bobwhite. We applied

*Song Sparrow*



Research conducted by  
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Karen Brasher, editor

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the habitat suitability model to an agricultural landscape in Clay County, MS and simulated usable space before and after 6% of the row crop was converted to 20' field borders. A 6% change in land use increased usable space for bobwhite by nearly 15%. Thus, a relatively small change in land use, disproportionately alters usable space in the landscape for bobwhite and may elicit an even larger proportional population response.

## Summary

Within intensive agricultural landscapes, field borders provide important idle herbaceous cover for grassland and early successional birds. Field borders may provide nesting, foraging, roosting, loafing, and escape cover. During winter, field borders may provide important habitat in southern agricultural systems where most short distance migrants overwinter. Field borders

provide important habitat for many grassland birds due to their greater abundance of food (weed seeds) and more complex vegetation structure compared to non-bordered field margins.

Field borders should be maintained as early successional communities through periodic disturbance (e.g. winter disking) to maintain seed producing plants, vegetation structure, and arthropods for grassland birds.

Resource management systems that support both birds and farm operators are important for maintenance of a diverse farmland bird population. However, implementation of conservation practices rest solely upon farm operators. Only cost-effective farmland conservation practices that accrue multiple environmental benefits while enhancing farmland wildlife will gain widespread acceptance and implementation.

## A Guide to Conservation Reserve Program: Northern Bobwhite Quail Habitat Initiative

- Only 9,400 acres of field borders available for enrollment in Mississippi.
- Cropland must be suitably located and adaptable to the establishment of bobwhite quail
- Conservation practice CP33: Habitat Buffers for Upland Birds can be applied around field edges of eligible cropland.
- This is a continuous conservation reserve program.
- Field borders must be a minimum of 30' to a maximum of 120' wide
- Incentives include \$100 per acre sign up, 50 percent cost share and 40 percent practice incentive payment.
- Contact the USDA Farm Service Agency for further information.

## Acknowledgements

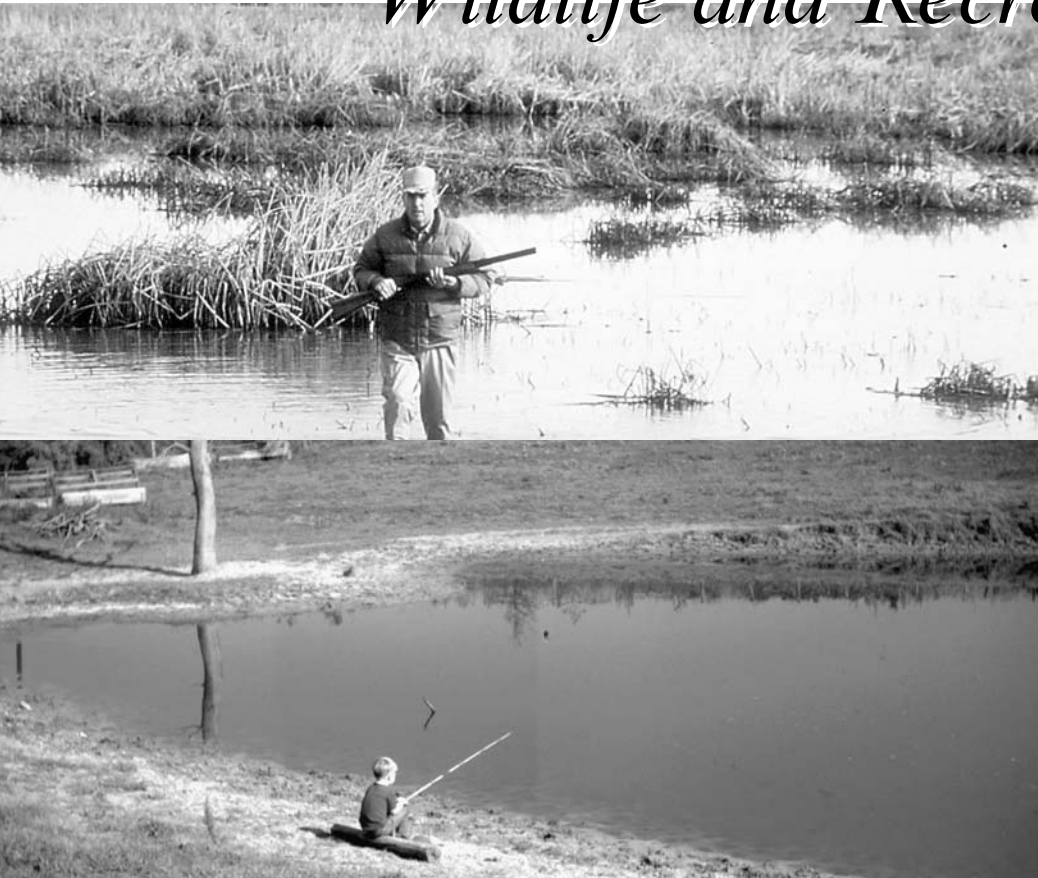
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# Mourning Dove

# NATURAL RESOURCE ENTERPRISES

## *Wildlife and Recreation*



## MOURNING DOVE MANAGEMENT FOR LANDOWNERS

For landowners interested in starting a natural resource-based alternative enterprise in the Southeast, managing fields planted to food plots for use by mourning doves (*Zenaida macroura*), and other wildlife species can be an attractive option.

One thing that makes it an attractive option is that it is not necessary to obligate large land areas to have a successful dove field. Other positive aspects include the small financial investment required, the direct and indirect benefits to other wildlife species, and the high level of social interaction and tradition associated with dove hunting.

The mourning dove is the most popular game bird in the country, with an annual harvest greater than all other game birds combined. In Mississippi, the mourning dove annual harvest is greater than any other game bird species. It is the number two most hunted small game species, second only to squirrels in numbers of hunters. Its quick flight, erratic movement, and its quality for eating make it popular among both hunters and wildlife enthusiasts.

Managing for doves can provide landowners enjoyment and an alternative source of income in the fall and winter.

## LIFE HISTORY

Mourning doves are medium-sized migratory birds that range from Alaska to most of South America. Recent surveys estimate there are approximately 500 million doves in the United States. Their song is a low-toned, mournful cooah, coo, coo, coo. The call of doves is a common sound in rural and suburban backyards, although it can easily go unnoticed. Although mourning doves are migratory birds, they will stay in warm climates, such as Mississippi, year-round. Whether they migrate or stay in one place year-round depends on their habitat and forage needs being met and the early winter's not being too severe.

Doves return to their breeding grounds in late winter. If there is an unusually heavy snowfall or temperatures near zero, many birds may die from freezing or not being able to find food. In Mississippi, early migrants may begin nesting as early as late February, and nesting increases through April. Clutch size averages two eggs per nesting cycle but can be as many as four eggs. For the first three days after the young hatch, the parents feed them crop milk, a highly nutritious liquid. After this, the young are fed seeds. The mourning dove nesting cycle takes approximately 33 days, beginning with nest building and incubation and ending with the fledglings leaving the nest. To maintain population numbers, pairs of birds try five or six nestings and often produce three or four broods in three to six nesting cycles per year. Generally five or six young will be raised per pair each year.

Mourning doves have a short lifespan, living on average just longer than one year. The mortality rate for first-year doves is between 60 and 75 percent, and adults have an average mortality rate of 50 to 60 percent. This is similar to rabbit, quail, and many other small game wildlife species. Because of their naturally high mortality rate, many doves that are not taken by hunters will die over the course of winter because of exposure, disease, or starvation. Hunters can annually harvest 15 percent of the mourning doves in the fall seasons without impacting the population as a whole.

Other doves that may be found using managed dove fields in the Southeastern United States include the Eurasian collared-dove (*Streptopelia decaocto*) and the ringed turtle-dove (*Streptopelia*

*risoria*). The Eurasian collared-dove (considered an exotic species) is becoming fairly common in some areas because of its rapid colonization of different parts of North America. The domesticated ringed turtle-dove is much less common and seems to be less capable of increasing its population once released into the wild. Both these species are most often observed in and around cities or suburban areas, but recently the Eurasian collared-dove has been found in rural areas where doves are hunted.

State regulations vary from state to state as to taking these exotic species during migratory bird hunting seasons. Be sure to check with your state wildlife agency regulations before taking such birds during regulated dove hunting seasons. Currently (2004) in Mississippi, you can harvest the Eurasian collared-dove during dove seasons, and this does not count against the specified bag limit of mourning doves.

The Eurasian collared-dove is considerably larger than the native mourning dove, has squared rather than pointed tail feathers, and is pale in color overall as compared to a mourning dove. Seen flying near each other, it is quite easy to tell the difference in species. The ringed turtle-dove is smaller than the Eurasian collared-dove but still slightly larger than the native mourning dove. The colors of this domesticated dove vary, but the overall appearance is usually very pale, almost white, and is very much different in coloration from the native mourning dove. Although the Eurasian collared-dove is larger, and paler, and its flight pattern is slightly different from that of mourning doves, when prepared for the table in the same manner as mourning doves, the taste is very similar.

For information about proper care of harvested doves in the field and preparation for freezing and for the table, contact the MSU Extension Wildlife and Fisheries Office at (662) 325-3174 or check the website: <http://msucare.com/wildfish/>.

## HABITAT AND FOOD

About the only things mourning doves eat are seeds and plants, although doves will sometimes eat insects. Their main diet is seeds from agricultural crops (grains), native grasses, and weeds. Mourning doves are poor scratchers and will not scratch for seeds. They feed primarily on open ground.

## PLANTING AND HARVESTING

Fields prepared for doves need to have some disked open areas to keep weeds from becoming established and going to seed. When managing your land for mourning doves, try to have foraging habitat near nesting sites. Doves will travel for food, but they prefer local food sources.

In Mississippi, nesting space is generally not a limiting factor. The preferred nesting habitat for doves is in trees or tall shrubs with an average height of 15 feet from the ground. A nesting site needs to provide cover from predators as well as protection from the sun in summer months and cold in late winter or early spring. In late winter, early nesting doves prefer coniferous trees for nesting to hide them from predators.

Doves require fresh water for drinking. There must be a pond, puddle, or stream near their nesting sites for access to fresh water daily, ideally in the morning and evening. The water source should be in an area with little vegetation. This gives them easy access to the water's edge and good visibility to be able to drink and watch for predators at the same time.

Mourning doves prefer seeds from the following plant species:

American sweetgum	Japanese millet
barley	Johnsongrass
barnyard grass	lespedeza
bristlegrass	pine seed
browntop millet	poke weed
buckwheat	primrose millet
Carolina cranebill	rye
common ragweed	sedges
corn	sesame
cowpeas	soybean
croton	Sudan grass
crowfoot	sunflower
Egyptian wheat	wheat
dove proso millet	wild peas
grain sorghum	

You should begin preparing a field that will provide food for doves and other wildlife species in early spring. By the time late summer arrives, some grains will have begun to shatter to provide food for the returning doves now beginning to flock to available food sources.

Plant a variety of grains, such as sunflower, browntop millet, and sorghum to increase the seed availability to the doves from early fall through winter. As an example, Mississippi Department of Wildlife, Fisheries, and Parks, in cooperation with Mississippi State University Extension Service, planted a demonstration field in 2003. The demonstration field alternated rows of browntop millet, sunflower, and bare ground. Two weeks before dove season, the rows between the millet and sunflower were disked to create bare ground that removed weeds that had grown since planting and provided open areas for doves to alight for feeding and to find grit. Also, leaving bare ground between rows made finding downed birds much easier for the hunters.

Here is a suggested planting sequence for mourning doves: Plant two strips of browntop millet, disk one strip for bare ground, plant one strip of sunflower, disk one strip for bare ground, and so forth. Repeat this sequence throughout the field.

- browntop millet
- browntop millet
- bare ground
- sunflower
- bare ground
- browntop millet
- browntop millet
- bare ground
- sunflower
- bare ground
- browntop millet
- browntop millet

If you plan to harvest grain crops, leave several rows unharvested, to provide seed through the winter for birds and other wildlife. Browntop millet will reseed if not disturbed or manipulated and allowed to mature. Simply disk the field lightly in the spring and fertilize. The millet seed left behind from the previous year will germinate and provide a good stand that can substantially lower your second-year planting costs. If you leave unharvested strips of millet and sunflower, this will provide food and cover for returning doves, coinciding with the split second and third hunting seasons.

Disk unplanted strips two to three weeks before dove season to ensure the open ground doves prefer to alight and walk around on. Disking also lets doves get to the seed that has shattered and is on the ground next to the planted strips. Disking at least two weeks ahead gives the birds enough time to recover from this habitat disturbance. For further information on the feeding preferences and planting recommendations for mourning doves and other wildlife species of the Southeast, see the Wildlife Food-Planting Guide for the Southeast, Extension Publication 2111.

If you don't want to use sunflower, either because of competing wildlife, such as deer eating the sunflower, or for some other reason, substitute a nonbird resistant variety of grain sorghum, milo, or Egyptian wheat. To correct a serious anticipated weed problem before planting, using Extension herbicide recommendations for selective species control as provided in Publication 1532, the 2004 Weed Control Guidelines for Mississippi.

## ESTIMATED COSTS

Costs for preparing a dove food plot as a wildlife enterprise will vary greatly, depending on the type of seed you plant, how you manage the standing crop, whether you provide cold drinks and water or other amenities to the hunters, whether you provide flagged stands, and if you will provide a meal and/or lodging after the hunt. To recover costs and make a profit, you should think about all of these factors when deciding what you will charge to hunt on your land.

You can use the following figures to calculate the cost of preparing a dove field: plant browntop millet at a rate of 8 pounds per acre if drilled, 10

pounds per acre if broadcast; and for best results, have a soil test before planting to determine the right fertilizer and possibly lime that will need to be added. If you don't have a soil test, 300 pounds per acre of 6-12-12 fertilizer for the browntop millet and 13-13-13 for the sunflower will be adequate on most soils.

An average 10-acre field of browntop millet and sunflower planted in strips will have the following estimated costs: seed will cost \$10 to \$12 per acre (varies, depending on time of the year you buy it, variety, and brand). Fertilizer prices can range from \$350 to \$400, depending on the fertility of the soil. Lime prices vary from \$45 to \$60 per ton (depending on the quality of the soil, it is best to have this tested before planting). Equipment and labor is estimated at \$30/hr for 8 hours of preparation, planting, and disking before season, or a total of \$240. Estimated total cost: \$700 (this is probably a higher estimate than average). Cost of herbicide applications, if needed, would be added to these costs.

## LIABILITY INSURANCE

Liability is a real concern for landowners allowing access to their land. Landowners who charge a fee need more protection for themselves and the hunters or other recreational users who access their land. If there is any doubt as to the potential for litigation from allowing fee access for dove hunting or other recreational use, it is advisable to seek the advice and counsel of an attorney. You can buy liability insurance separately or add it as a rider to an operation policy you already have. Consider developing a waiver or including a release agreement that must be signed by everyone who hunts on your property. If there are any risk factors, such as old well sites, downed power lines, dead trees that may fall, or other risks that could be seen as landowner negligence, you should inform users or solve the problems before allowing access to your property.

When getting insurance, you should be aware that liability insurance covers loss caused by negligence but not loss caused by a willful act of the insured. Negligence is one of the conditions that can be greatly reduced on most private lands through risk planning. Anyone who allows public use of his or her land for recreational use, whether



or not a fee is charged for access and/or use of the property, should consider getting sufficient liability insurance coverage. Liability insurance companies generally limit the total liability of the insurance company to a specific sum per occurrence, which may be much less than the liability incurred by the insured, but it does reduce the risk of loss.

If you already have insurance on your property, you can work with your present insurer to see if a rider can be added as a supplement to the policy you already have to get adequate liability coverage. Others who plan to lease their land to an individual or group may require the lessee(s) to get liability insurance as a part of their written lease agreements. A number of insurance companies offer a rider for coverage of public recreational use or for hunting clubs. If you have questions about the need for liability insurance for the type of natural-resource enterprise you are considering, you may want to consult your attorney.

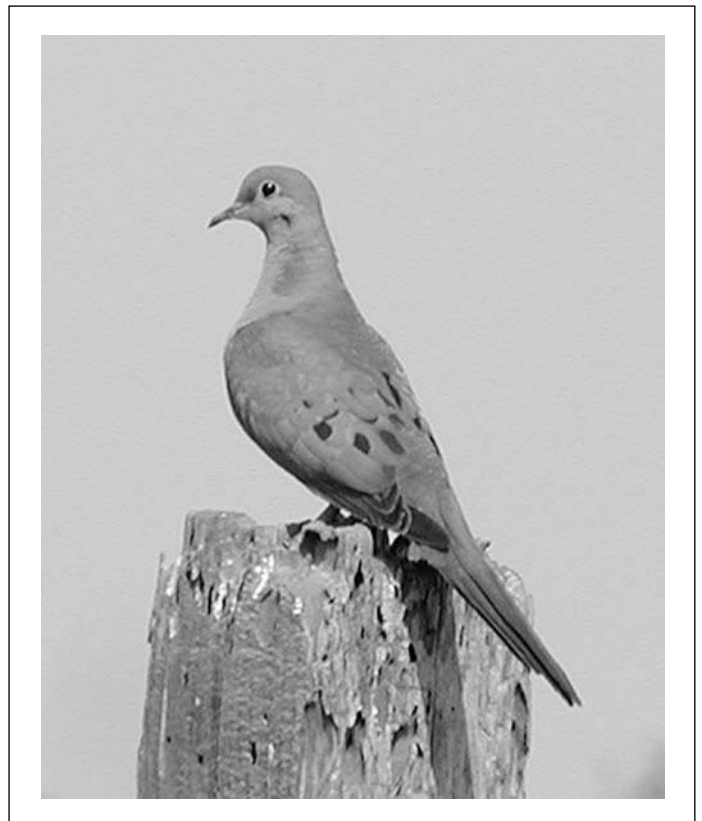
## REGULATIONS

The mourning dove is a federally-regulated migratory bird, but because it is also a widely hunted game species, it requires certain restrictions on hunting. When you are hunting mourning doves, the maximum allowed bore size of a shotgun is 10 gauge, the shotgun must not hold more than three shells at any given time, and it is illegal to use bait or live decoys to attract doves. Federal regulation requires that grains used to attract doves must be planted in a standard agricultural manner. Changing the field after the grain has matured, by disking or bush hogging is allowed, as long as you don't add grain of any type to the field. It is illegal to place piles of grain or to add other grain of any type into the field. If there is any question about the way grain in the field has been manipulated, you can contact the U.S. Fish and Wildlife Service enforcement agent or State Wildlife Agency enforcement officers and ask them to conduct a field check before hunting season to make sure you comply with existing regulations.

It is important for all hunters who will be allowed access to your land to know the rules and regulations that apply to the hunt, and it is essential they abide by them. Have all hunters show up at a set time and location before they enter the field to

discuss rules and regulations you expect them to obey while on your property. This discussion would include the following:

1. Inform hunters of shooting hours, for example: 30 minutes before sunrise until sunset. Plan either a morning or afternoon shoot, but do not allow both the first day, or you will find yourself having birds stay around only a very short while. To keep birds returning to a prepared field, set up morning or afternoon hunts only once or twice a week and never on two days in a row. Ideally, it is best to alternate one hunt per week in the morning and, if desired, another in the afternoon later on in the week.
2. To avoid confusion and potential over harvesting of the birds coming to the field, all hunters who are finished shooting or who have shot their limit should leave the field as soon as possible afterward. The legal bag limit is 15 mourning doves in Mississippi, and the possession limit is 30, except on the first day of the season. The possession limit is not allowed on the first day of any of the three separate hunting seasons.
3. Legally, shotguns must not be able to hold more than three shells at any time when hunting doves (one in the chamber and two in the magazine



of pumps and semi-automatics). When hunting doves, except for use of side by side, over and under, or single shot shotguns, the hunter must plug his shotgun so that not more than two shells can be inserted into the magazine.

4. Hunters must have a valid state hunting license that is signed and on their person before going into the field or qualify for an exemption as dictated by the Mississippi Department of Wildlife, Fisheries, and Parks.

For comprehensive regulation information on mourning doves in Mississippi, contact the Mississippi Department of Wildlife, Fisheries, and Parks, Wildlife Division, 1505 Eastover Drive, Jackson, MS 39211. Website: [www.mdwfp.com](http://www.mdwfp.com).

## SAFETY

Safety is paramount to having an enjoyable dove hunt. Few things will sour hunter enthusiasm or enjoyment faster than being cited for a violation or having a hunter shot by another hunter shooting at a low-flying bird.

The following simple rules of thumb will help your hunt go smoothly and safely:

- ✓ Keep hunters separated a safe distance, which is at least 100 yards between hunters.
- ✓ Remind hunters never to shoot at low-flying birds or birds that alight in the field because of the danger of shooting a fellow hunter.
- ✓ Recommend that all hunters wear protective glasses.
- ✓ Never allow anyone in the field to drink or take alcohol into the field during shooting hours.

## OTHER CONSIDERATIONS

Managing a dove field properly will provide many hours of shooting enjoyment as well as doves harvested for the grill or skillet. When designing your management strategy, include posting small signs with station numbers, and request that hunters stay near their posts while shooting. This will keep hunters from clustering in hot spots, such as areas where most birds fly into the field, which could lead to a hunting accident.

You need to post starting and ending times for morning and evening shoots, and hunters need to

follow them. The earlier all shooters leave a field, the more likely birds will keep returning to the field as long as food continues to be available. For example, hunters who begin shooting 30 minutes before sunrise and leave by 9:30 a.m. or earlier will enable doves to return to the field to feed. However, if doves are shot in the field until noon, many of the birds will find other places to feed. The more time hunters spend shooting doves in your field, the higher the likelihood that the number of returning birds will decrease significantly. The same principles also apply for afternoon hunts. While the birds may fly later in the afternoon on very hot days, it is still best to leave the field as soon as possible to let the birds return to feed before sunset. Once a shooter reaches his bag limit and leaves the field, invite another shooter to move to the empty station if he wants to, to increase his chance for shots.

If you want to shoot your dove field twice per week, it is best to space the hunts apart, for example on a Saturday, and either a Tuesday or Wednesday. Keeping hunts three or more days apart and limiting the number of hours hunters are in the field should keep birds returning to the field through the season.

## FINDING DOWNED BIRDS

It is important for dove management, as well as good sportsmanship, that you make every effort to find downed birds. If you have a retriever, this should be easy. Let the dog do the work for you. Without a dog, though, more effort is needed. One strategy is to stop every time you shoot a bird and remove your shells. Do not reload until you find the downed bird to ensure you are not tempted to take another bird, thus having two birds down in different places. Disking strips into your field will also be helpful. It will let you see into the rows of vegetation and more easily find the downed bird.

## ADVICE FOR HUNTERS

You should be ready to answer questions from novice hunters regarding hunting basics. When advising an inexperienced hunter, suggest he aim for birds within 20 to 30 yards, and pick shots based on his level of skill. The hunter's ability will determine how much time is needed in the field and how many

shots he takes to bag his limit. On average, a hunter will use about 75 shells to reach a 15-bird bag limit. This will vary greatly, based on experience and shooting skill. An excellent hunter skilled in wing-shooting may use 25 shells or fewer to take his limit.

The shot size, shotgun action type, and gauge are mostly based on personal preference. Most hunters select small shot sizes from 7 1/2 to 9's. The main point is that doves do not require magnum loads or large-sized shot. Also, shooting a light recoiling shotgun will make a large difference by the end of the hunt for a new hunter's comfort.

For the average hunter, shotgun choke is also a personal choice. Skeet or improved cylinder choke is generally more than enough for shooting doves. For a double gun, ideal chokes are improved cylinder and modified.

## COMFORT AND FEES CHARGED

The first season is generally quite hot, and it is advisable for hunters to wear either camo or dull colored clothing. Besides dressing light, you may want to carry a small ice chest filled with cold water and sodas for drinking while in the field.

Depending on the facilities and fees charged, some landowners choose to provide water, soda, and/or a meal for the hunters. The costs to hunters can vary from as low as \$10 per shooter per hunt to more than \$100, depending on costs and amenities the landowner has provided to the hunters. To recover costs of preparing a dove field, landowners must know those costs. Some landowners with lodging and dining facilities offer package hunts for corporate or other groups at appropriate costs, which may be more than \$250 per hunter and may have facilities for a morning fishing trip and afternoon hunt

Currently, the most common prices seen advertised for a half-day dove hunt in Mississippi range from \$10 per hunter to \$150 per hunter. Again, this varies, depending on the services and amenities provided, and whether the hunt will be on land prepared by the landowner as a dove food plot or simply a harvested corn or wheat field.

## HUNTER EXPECTATIONS

When paying to enter a dove field, hunters should expect the following:

- ✓ Everyone entering the field will practice safe hunting conditions. You won't know this unless all other hunters are friends who you know are experienced and ethical hunters.
- ✓ The landowner, or someone in charge of the hunt, should provide ground rules that include what the field size is limited to and where the property lines are.
- ✓ Alcoholic beverages are prohibited from the field during the hunt.
- ✓ All hunters have been informed not to shoot at low-flying birds or birds alighting in the field because of risk of shooting another hunter.
- ✓ Legal shooting hours will be adhered to.
- ✓ All hunters will make every possible effort to find all downed birds.
- ✓ Bag limits will be strictly adhered to.
- ✓ Harvested doves will not be cleaned in the field.
- ✓ Hunters will collect and take spent shells out of the field for proper disposal when they are finished shooting.
- ✓ Hunters will stay within the general area of their stations except to find downed birds.
- ✓ Hunters are expected to leave the field when they have taken their bag limit of birds, when they tire of shooting, or at a set time (when hunting in the morning – 9:30 to 10:00 a.m., no later than 15 minutes before sun set if hunting in the afternoon).
- ✓ If water or cold drinks are provided, how often will such beverages be provided.
- ✓ Everyone will be required to plug repeating shotguns to prevent their holding more than two shells in the magazine.



This publication is provided as an educational tool and reference source and is not a substitute for individualized legal advice regarding liability for fee recreational use of private lands for hunting or other related purposes. Lease agreements for recreational use of private lands should be written documents that have been prepared or reviewed by an appropriate attorney. The use of the information provided in this publication by any person constitutes an agreement to hold harmless the authors, Mississippi State University Extension Service, and the Mississippi Department of Wildlife, Fisheries and Parks for any liability, claims, damages, or expenses that may be incurred as a result of reference to or reliance on the information contained in this publication.

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# Nongame birds

## LANDSCAPING TO ATTRACT BIRDS

### INTRODUCTION

Among the fondest and most memorable moments of childhood are the discoveries of songbirds nesting in the backyard. The distinctive, mud-lined nests of robins and their beautiful blue eggs captivate people of all ages. Likewise, the nesting activities of house wrens, cardinals, chickadees, and other common birds can stimulate a lifelong interest in nature.

As people learn to enjoy the beauty of birdlife around their home, they may wish to improve the “habitat” in their yard so that more birds will visit their property. You can attract birds by placing bird feeders, nest boxes, and bird baths in your yard, and by planting a variety of trees, shrubs, and flowers. These can provide good nesting sites, winter shelter, places to hide from predators, and natural food supplies that are available year-round.

### BENEFITS OF LANDSCAPING FOR BIRDS

At least ten benefits can be derived from landscaping to attract birds to your yard:

#### Increased Wildlife Populations

You can probably double the number of bird species using your property with a good landscaping plan.

#### Energy Conservation

By carefully arranging your conifer and hardwood trees, you can lower winter heating and summer cooling bills for your house.

#### Soil Conservation

Certain landscape plants can prevent soil erosion.

#### Natural Beauty

A good landscaping plan will contribute to a beautiful, natural setting around your home that is pleasing to people as well as birds.

#### Wildlife Photography

Wildlife photography is a wonderful hobby for people of all ages.

#### Birdwatching

A fun hobby is to keep a list of all the birds seen in your yard or from your yard. Some people have counted over 190 species of birds in their yard!

#### Natural Insect Control

Birds such as tree swallows, house wrens, brown thrashers, and orioles eat a variety of insects.

#### Food Production

Some plants that attract wildlife are also appealing to people. Cherries, chokecherries, strawberries, and crabapples can be shared by people and wildlife.

#### Property Value

A good landscaping plan can greatly increase the value of your property by adding natural beauty and an abundance of wildlife.

#### Habitat for Kids

Some of the best wildlife habitats are the best “habitats” for young people to discover the wonders of nature. A backyard habitat can stimulate young people to develop a lifelong interest in wildlife and conservation.

## BASICS OF LANDSCAPING FOR BIRDS

Landscaping for birds involves nine basic principles:

### Food

Every bird species has its own unique food requirements, and these may change as the bird matures and as the seasons change. Learn the food habits of the birds you wish to attract. Then plant the appropriate trees, shrubs, or flowers that will provide the fruits, berries, grains, seeds, acorns, nuts, or nectar.

### Water

You can probably double the number of bird species in your yard by providing a source of water. A frog pond, water garden, or bird bath will get lots of bird use, especially if the water is dripping, splashing, or moving.

### Shelter

Birds need places where they can hide from predators and escape from severe weather. Trees (including hollow ones), shrubs, tall grass, and bird houses provide excellent shelter.

### Diversity

The best landscaping plan is one that includes a wide variety of plants. This helps attract a greater number of bird species.

### Four Seasons

It is necessary to provide birds with food and shelter during all four seasons of the year. Plant trees, shrubs, and flowers that will provide year-round food and shelter.

### Arrangement

Habitat components need to be properly arranged. Consider the effects of prevailing winds (and snow drifting) so your yard will be protected from harsh winter weather.

### Protection

Birds should be protected from unnecessary mortality. When choosing the placement of bird feeders and nest boxes, consider their accessibility to predators.

Picture windows can be death traps for birds. A network of parallel, vertical strings spaced 4 inches apart can be placed on the outside of windows to prevent this problem.

You also should be cautious about the kinds of herbicides and pesticides used in your yard. They should be applied only when necessary and strictly according to label instructions.

### Hardiness Zones

When considering plants not native to your area, consult a plant hardiness zone map (they are in most garden catalogues). Make sure the plants you want are rated for the winter hardiness zone classification of your area.

### Soils and Topography

Consult with your local garden center, university, or county extension office to have a soil test done for your yard. Plant species are often adapted to certain types of soils. By knowing what type of soil you have, you can identify the types of plants that should grow best in your yard.

## PLANTS FOR WILD BIRDS

Seven types of plants are important for bird habitat:

### Conifers

Conifers are evergreen trees and shrubs that include pines, spruces, firs, arborvitae, junipers, cedars, and yews. These plants are important as escape cover, winter shelter, and summer nesting sites. Some also provide sap, buds, and seeds.

### Grasses and Legumes

Grasses and legumes can provide cover for ground nesting birds--especially if the area is not mowed during the nesting season. Some grasses and legumes provide seeds as well. Native prairie grasses are becoming increasingly popular for landscaping purposes.

### Nectar-Producing Plants

Nectar-producing plants are very popular for attracting hummingbirds and orioles. Flowers with tubular red corollas are especially attractive to hummingbirds. Other trees, shrubs, vines and flowers can also provide nectar for hummingbirds.

### Summer-Fruiting Plants

This category includes plants that produce fruits or berries from May through August. Among birds that can be attracted in the summer are brown thrashers, catbirds, robins, thrushes, waxwings, woodpeckers, orioles, cardinals, towhees, and grosbeaks. Examples of summer-fruiting plants are various species of cherry, chokecherry, honeysuckle, raspberry, serviceberry, blackberry, blueberry, grape, mulberry, plum, and elderberry.

### Fall-Fruiting Plants

This landscape component includes shrubs and vines whose fruits are ripe in the fall. These foods are important both for migratory birds which build up fat reserves prior to migration and as a food source for non-migratory species that need to enter the winter season in good physical condition. Fall-fruiting plants include dogwoods, mountain ash, winter-berries, cottoneasters, and buffalo-berries.

### Winter-Fruiting Plants

Winter-fruiting plants are those whose fruits remain attached to the plants long after they first become ripe in the fall. Many are not palatable until they have frozen and thawed numerous times. Examples are glossy black chokecherry, Siberian and "red splendor" crabapple, snowberry, bittersweet, sumacs, American highbush cranberry, eastern and European wahoo, Virginia creeper, and Chinaberry.

### Nut and Acorn Plants

These include oaks, hickories, buckeyes, chestnuts, butternuts, walnuts, and hazels. The meats of broken nuts and acorns are eaten by a variety of birds. These plants also provide good nesting habitat.

## HOW TO GET STARTED

Think of this project as "landscaping for birds." Your goal will be to plant an assortment of trees, shrubs, and flowers that will attract birds. If you plan carefully it can be inexpensive and fun for the whole family. The best way to get started is to follow these guidelines:

### Set Your Priorities

Decide what types of birds you wish to attract, then build your plan around the needs of those species. Talk to friends and neighbors to find out what kinds of birds frequent your area. Attend a local bird club meeting and talk to local birdwatchers about how they have attracted birds to their yards.

### Use Native Plants When Possible

Check with the botany department of a nearby college or university or with your Natural Heritage Pro-



gram for lists of trees, shrubs, and wildflowers native to your area. Use this list as a starting point for your landscape plan. These plants are naturally adapted to the climate of your area and are a good long-term investment. Many native plants are beautiful for landscaping purposes and are excellent for birds. If you include non-native plant species in your plan, be sure they are not considered “invasive pests” by plant experts.

#### Draw a Map of Your Property

Draw a map of your property to scale using graph paper. Identify buildings, sidewalks, powerlines, buried cables, fences, septic tank fields, trees, shrubs, and patios. Consider how your plan relates to your neighbor’s property (will the tree you plant shade out the neighbor’s vegetable garden?) Identify and map sunny or shady sites, low or wet sites, sandy sites, and native plants that will be left in place. Also identify special views that you wish to enhance--areas for pets, benches, picnics, storage, playing, sledding, vegetable gardens, and paths.

#### Get Your Soil Tested

Get your soil tested by your local garden center, university, or soil conservation service. Find out what kinds of soil you have, and then find out if your soils have nutrient or organic deficiencies that can be corrected by fertilization or addition of compost. The soils you have will help determine the plants which can be included in your landscaping plan.

#### Review the Seven Plant Habitat Components

Review the seven plant components that were described previously. Which components are already present? Which ones are missing? Remember that you are trying to provide food and cover through all four seasons. Develop a list of plants that you think will provide the missing habitat components.

#### Confer With Resource Experts

Review this plant list with landscaping resource experts who can match your ideas with your soil types, soil drainage, and the plants available through state or private nurseries. People at the nearby arboretum may be able to help with your selections. At an arboretum you can also see what many plants look like.

#### Develop Your Planting Plan

Sketch on your map the plants you wish to add. Trees should be drawn to a scale that represents three-fourths of their mature width and shrubs at their full mature width. This will help you calculate how many trees and shrubs you need. There is a tendency to include so many trees that eventually your yard will be mostly shaded. Be sure to leave open sunny sites where flowers and shrubs can thrive. Decide how much money you can spend and the time span of your project. Don’t try to do too much at once. Perhaps you should try a five year development plan.

#### Implement Your Plan

Finally, go to it! Begin your plantings and be sure to include your family so they can all feel they are helping wildlife. Document your plantings on paper and by photographs. Try taking pictures of your yard from the same spots every year to document the growth of your plants.

#### Maintain Your Plan

Keep your new trees, shrubs, and flowers adequately watered, and keep your planting areas weed-free by use of landscaping film and wood chips or shredded bark mulch. This avoids the use of herbicides for weed control. If problems develop with your plants, consult a local nursery or garden center.

#### And Finally...

Most of all, take the time to enjoy the wildlife that will eventually respond to your efforts at landscaping for birds.

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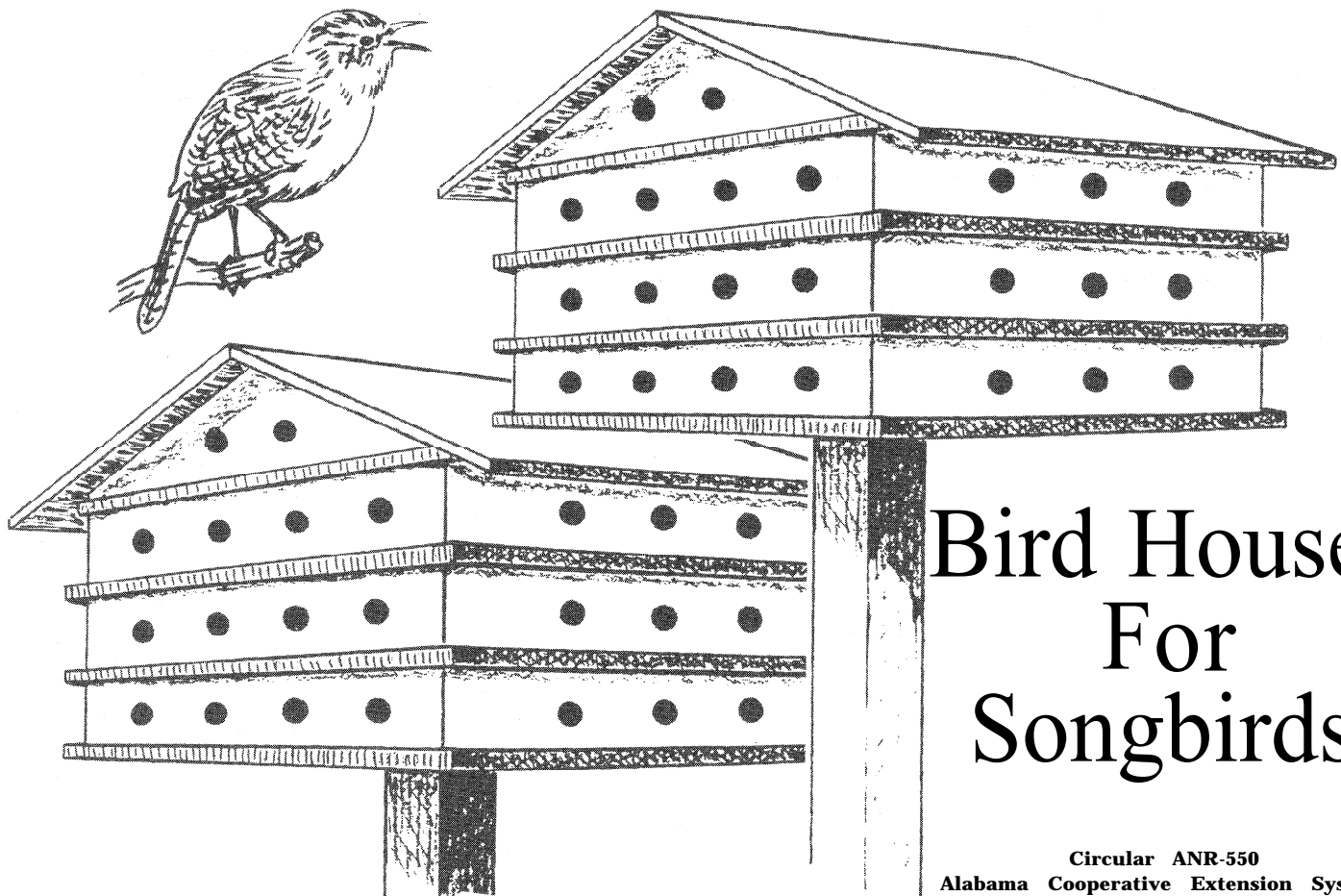
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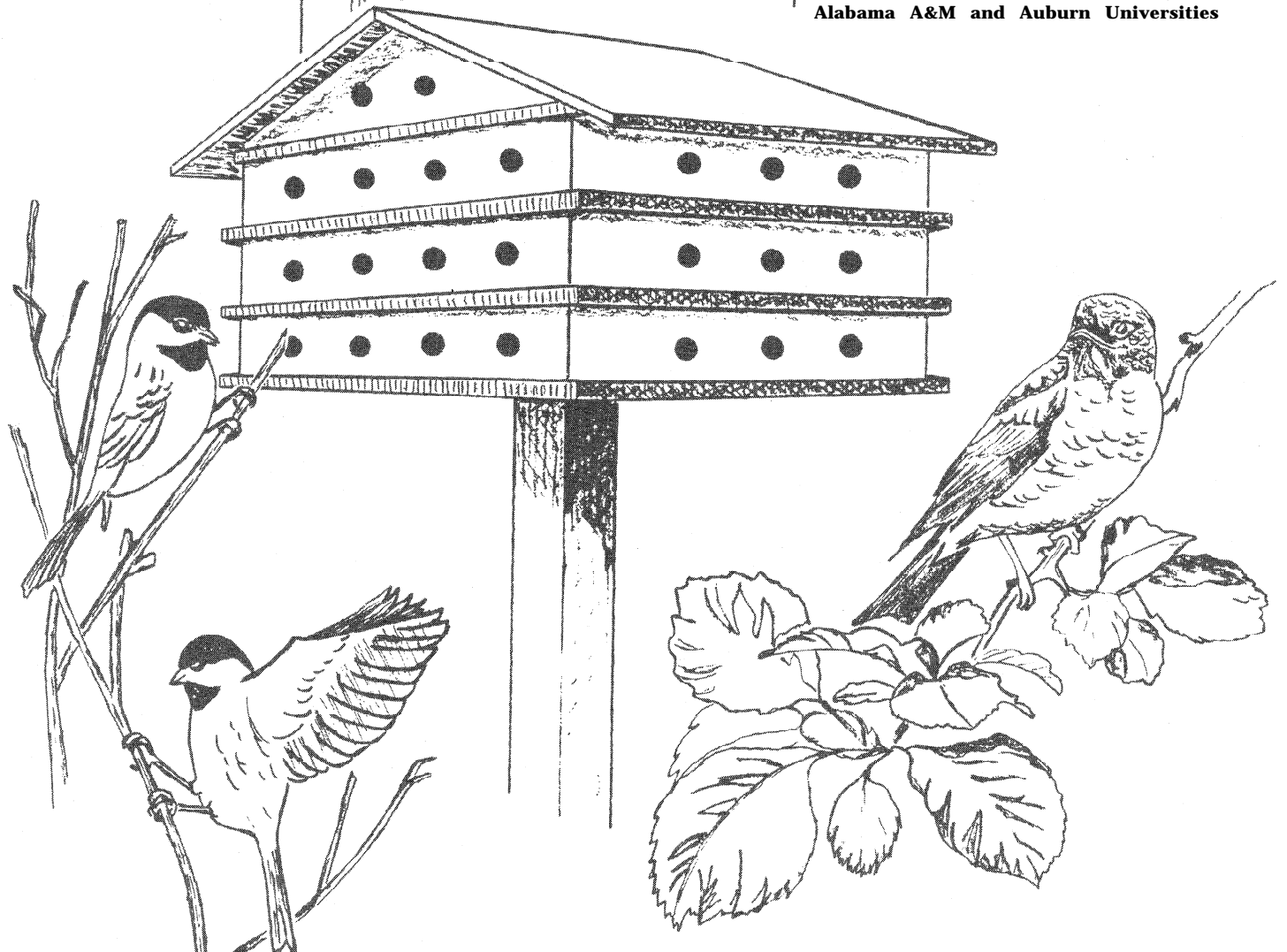
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Produced by the U.S. Fish and Wildlife Service



# Bird Houses For Songbirds

Circular ANR-550  
Alabama Cooperative Extension System  
Alabama A&M and Auburn Universities



# Bird Houses For Songbirds

H. Lee Stribling  
Extension Wildlife Specialist

**B**luebirds, robins, chickadees, titmice, wrens, and purple martins adapt easily to using bird houses. They will choose rural or urban yards alike where there is a small patch of suitable habitat. This may consist of homemade bird houses and berry baskets of hair, moss, cottonballs, and yarn. Or, it may be a patch of wild garden and trees. The birds' nest building and food gathering provide hours of entertainment to armchair bird watchers.

## Nest Box Construction

**Lumber.-Almost** any grade of untreated lumber can be used to build nest boxes. Several types of wood, however, are more durable and desirable. Treated *lumber should not be used for nest boxes*. The most durable woods include cypress, cedar, and redwood. Pine, although less durable, is easier to work and somewhat less expensive than other wood. Exterior-grade plywood can also be used; it is recommended for roof boards, no matter what lumber is used to construct the nest box. Lumber should be at least 3/4 inch thick to provide insulation for the birds. Nest box dimensions and height for placement are shown in Table 1. Construction details of some boxes are shown in Figures 1 to 4.

**Painting.-Painting** is not necessary except for purple martin houses or others made of soft wood. Use a water-based exterior latex if the box needs paint. Do not install the box for at least 2 weeks after painting. Light shades of green, gray, and tan are the best choices for nest boxes. Only light colors should be used. Dark colors may cause boxes to overheat and injure eggs and young. Martin condominiums, which are usually placed in open areas, may be painted white to reflect even more light.

**Table 1. Nest Box Dimensions And Heights For Box Placement.**

Species	Box Floor (inches)	Box Depth (inches)	Entrance Height* (inches)	Entrance Diameter (inches)	Box Height (feet)
American robin**	7x8	8	—	—	6-15
Eastern bluebird	4x4	8-12	6-10	1-1/2	4-6
Chickadee	4x4	8-10	6-8	1 1/8	4-15
Tufted titmice	4x4	8-10	6-8	1-1/4	5-15
Crested flycatcher	6x6	8-10	6-8	1-3/4	5-15
Phoebes**	6x6	6	—	—	8-12
Brown-headed nuthatch	4x4	8-10	6-8	1-1/4	5-15
White-breasted nuthatch	4x4	8-10	6-8	1-3/8	5-15
Prothonotary warbler	5x5	6	4-5	1-3/8	4-8
Barn swallow**	6x6	6	—	—	8-12
Purple martin	6x6	6	1-2	2-X	6-20
Downy woodpecker	4x4	8-10	6-8	1-1/4	5-15
Hairy woodpecker	6x6	12-15	9-12	1-1/2	8-20
Pileated woodpecker	8x8	16-24	12-20	3x3	15-25
Red-headed woodpecker	6x6	12-15	9-12	2	10-20
Yellow-bellied sapsucker	6x6	12-15	9-12	1-1/2	10-20
Carolina wren	4x4	6-8	4-6	1-1/2	5-10
House wren	4x4	6-8	4-6	1-1/4	5-10

\* Height of entrance above nest box floor.

\*\* Use nesting shelf with open front.

**Drainage and Ventilation.-Boxes** should be ventilated by leaving narrow spaces between the roof and sides or by drilling two G-inch holes in the sides. Drainage holes may be drilled in the floor or 3/8-inch can be cut away from each corner of the floor (Fig. 2).

## Nesting Baskets

In many urban areas it is difficult for birds to find nesting materials. Light materials placed in hanging berry baskets will be used readily by yard-nesting songbirds. Attach berry baskets to sturdy limbs with nylon cord. Place them out of reach of cats and dogs. Light materials such as dog hair, moss, cotton balls, yarn, and string can be placed in the baskets, and birds will use them throughout the breeding season.

## Tenants For Your Bird Houses

**Bluebirds.-Eastern** bluebirds are one of Alabama's most beautiful year-round residents. The adult males are brilliant blue above and reddish or rust below with a white underbelly. Females are drab versions of the males.

Populations of these birds have grown rapidly over the past few years, mostly in response to people constructing and placing nest boxes. Bluebird Trails where boxes are placed along paths through good bluebird habitat have been established in many states. This partially compensates for the loss of preferred nesting sites such as wooden fence posts and cavity trees. Before bluebird boxes were erected in great numbers, starlings and house sparrows reduced the bluebird population by competing for and winning available nesting sites.

Bluebirds usually nest along woodland edges of open fields or other open areas. They are often seen along farm fields, golf courses, and pastures. Nest boxes placed along the edges of these areas are preferred nest sites. A good supply of insects and berries are essential to this songbird. It does not usually feed at bird feeders.

Nest boxes should be placed 3 to 5 feet above ground and at least 25 feet from the nearest tree. Nests should be removed from the boxes after each group of young birds (brood) has left the nest (fledged).

**Robins.-American** robins are not cavity nesters; they are platform nesters. Robins winter in Alabama but generally nest from central Alabama northward to Alaska. Migrating robins pass through Alabama in March on their way to northern nesting grounds.

Robins are fairly large songbirds that are often seen feeding on moist lawns. This bird population has actually grown in response to human development of habitats considered typical for robins. Now robins are found in a variety of habitats ranging from deep woodlands to inner city parks, all of which are ready sources for the fruits, berries, insects, and earthworms robins eat.

Robins' nests are not neat. They build of grass, twigs, and mud in orchard trees, shrubs, and on build&s. Highly compatible with human developments, robins will use man-made nesting platforms when available.

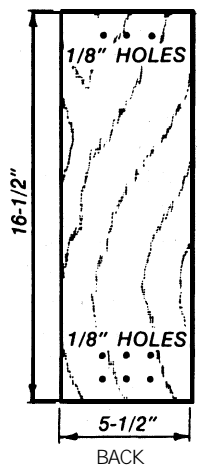
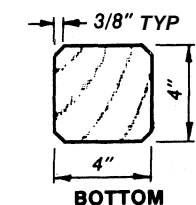
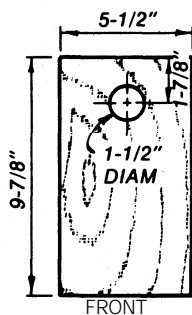
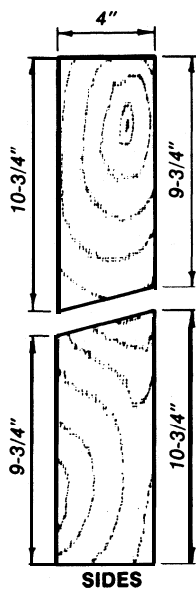
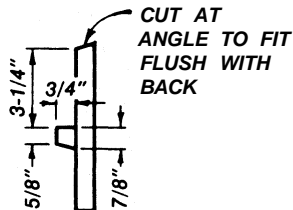
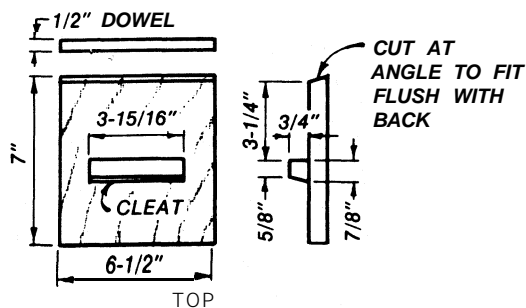
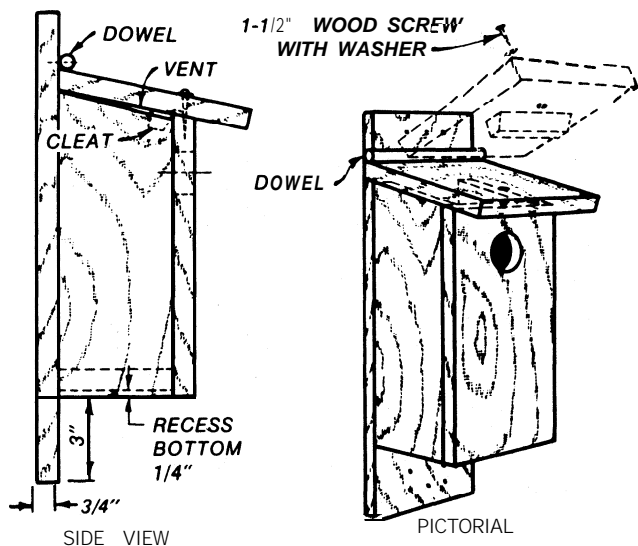


Figure 1. Construction details for a top-opening songbird nest box.

Nesting platforms should be placed on a tree or on a pole near a tree 6 to 15 feet above ground. Fairly open areas with protective shading are preferred.

**Carolina Chickadee.**-Carolina chickadees are friendly little birds that sing year-round. They have buzzy *Chickadee-dee-dee-dee* calls. Their black caps and bibs, white cheek patches, gray backs, and pale undersides are easily distinguishable from other local songbirds.

Chickadees are not migratory. And, they are common at the feeder. They live with equal ease in woodland habitats and in close association with human beings. In hot summer months, however, chickadees will often retreat to the cooler moist woodlands.

Chickadees consume numerous farm and garden pests. They search from daylight to dusk for their primary summer food items-insects. They also feed on seeds, berries, and other fruits.

Chickadees nest in decayed stumps, abandoned nest holes, or in nest holes they have excavated. They build nests of moss, feathers, and other soft materials. Nest boxes for chickadees should be placed 6 to 15 feet above ground near several large trees. Protective shading should also be provided.

**Tufted Titmouse.**-Common in most yards, the tufted titmouse is often seen with Carolina chickadees. And, like the chickadee, it feeds heavily at feeding stations. A year-round resident of Alabama, the tufted titmouse supplements its heavy insect diet with seeds and berries. Tufted titmice are mostly gray with a gray tuft or crest on the top of its head, white under parts, and very light orange sides. The song of the tufted titmouse is a loud and fairly rapid *peter, peter, peter*, repeated regularly.

In many ways similar to the chickadee, the tufted titmouse frequents a wide variety of habitats from woodlands to residential areas. A cavity nester, too, it often nests in deserted woodpecker cavities, natural tree cavities, and in nest boxes; it will even excavate a cavity if soft wood is available. Nest boxes for titmice should be placed 4 to 10 feet above ground on posts or trees located at woodland edges.

**Wrens.**-Carolina wrens and house wrens are small, nonmigratory songbirds that can be seen throughout the year in Alabama. Of these two birds, Carolina wrens are an especially desirable yard species because they tend to sing year-round. Their resonant *tea kettle* song is unmistakable. The distinct white eye lines and buff yellow under parts are characteristic of these wrens. The smaller house wren is more drab, with few distinguishing marks. The song of this species is bubbly but otherwise less distinctive than that of the Carolina wren.

Wrens feed almost exclusively on insects, spiders, and other invertebrates, but, in winter, Carolina wrens will sometimes use bird feeders stocked with small black sunflower seeds or suet.

Carolina wrens and house wrens are attracted to thickets and brush piles bordering open areas. They will often nest in yards near these brush piles. If nest boxes are not available, these birds will nest in almost any

available cavity. Carolina wrens are notorious for nesting in any available spot, including hanging potted plants and the pockets of clothing left hanging on the clothesline.

And, wrens are not choosy about man-made nesting places. Clay flower pots with slightly enlarged drainage holes provide excellent nesting cavities for wrens when placed flush with a vertical surface. Coconuts with suitably sized entrance holes (1 1/4 inches in diameter) are also readily used.

Wrens frequently construct dummy nests in the immediate vicinity of their actual nest sites. These dummy nests may serve to confuse predators or to reduce the chances of other birds nesting nearby.

Wren houses should be placed 6 to 10 feet above ground on poles. Place the poles in open areas near brush piles or thickets to attract the most wrens.

**Purple Martins.**-Although not generally considered a songbird species, purple martins are easy to attract and a favorite yard species in the southeast. These birds are noted for their tremendous appetites for mosquitoes and are well appreciated in most communities.

The fairly large, shiny, bluish-purple martins are migratory, spending the winter in South America. Purple martins send out scouts in mid-February to March to search out potential nest sites; the remaining colony members arrive later. Nest boxes must be erected before the scouts arrive to attract purple martins for a particular season.

Purple martins inhabit open woodlands and field edges usually near lakes or ponds. They feed on insects. Preferred nesting sites are woodpecker holes, natural tree cavities, caves, and man-made martin condominiums and gourd houses.

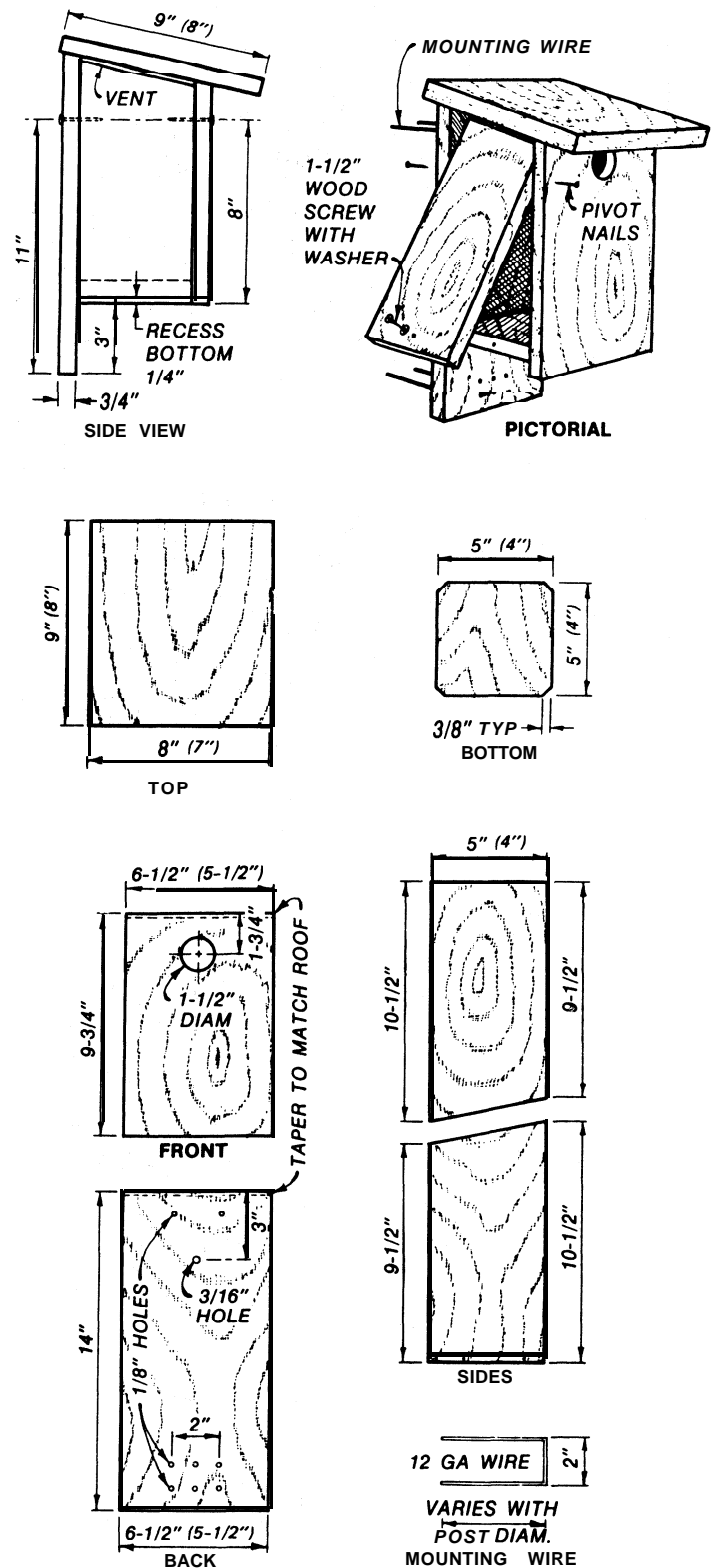
Purple martin houses should be placed on poles in fairly open areas 15 to 20 feet above ground. These houses should be taken down and cleaned at the end of the nesting season and then put back in early February before the scouts arrive.

### Predation And Competition

In recent years, starlings and house sparrows have developed reputations for competing with cavity nesters for nest sites. Native birds that can use cavities with small entrance holes (less than 1 1/4 inches in diameter) are less likely to suffer from competition from house sparrows. Starlings will prey on nestlings of other birds if perches are placed on the nest boxes or if entrance holes are large enough to allow starlings to reach down into nest boxes. When large populations of sparrows or starlings are present, nesting structures should be located at least 1,300 feet from human dwellings, barns, or feed lots.

### Landscaping And Water Availability

Besides providing nest boxes for songbirds, many homeowners want to do more to attract birds to their yards. Managing the area around your home for birds is simple, especially if traditional gardening is already being done. Plan for available food plants, feeding stations, adequate plant cover, nesting sites, and a year-round supply of water.



NOTE: Dimensions in parentheses are for a 4"x4" nest box, which is suitable for Eastern Bluebirds, Mountain Bluebirds or larger.

Figure 2. Construction details for a side-opening songbird nest box.

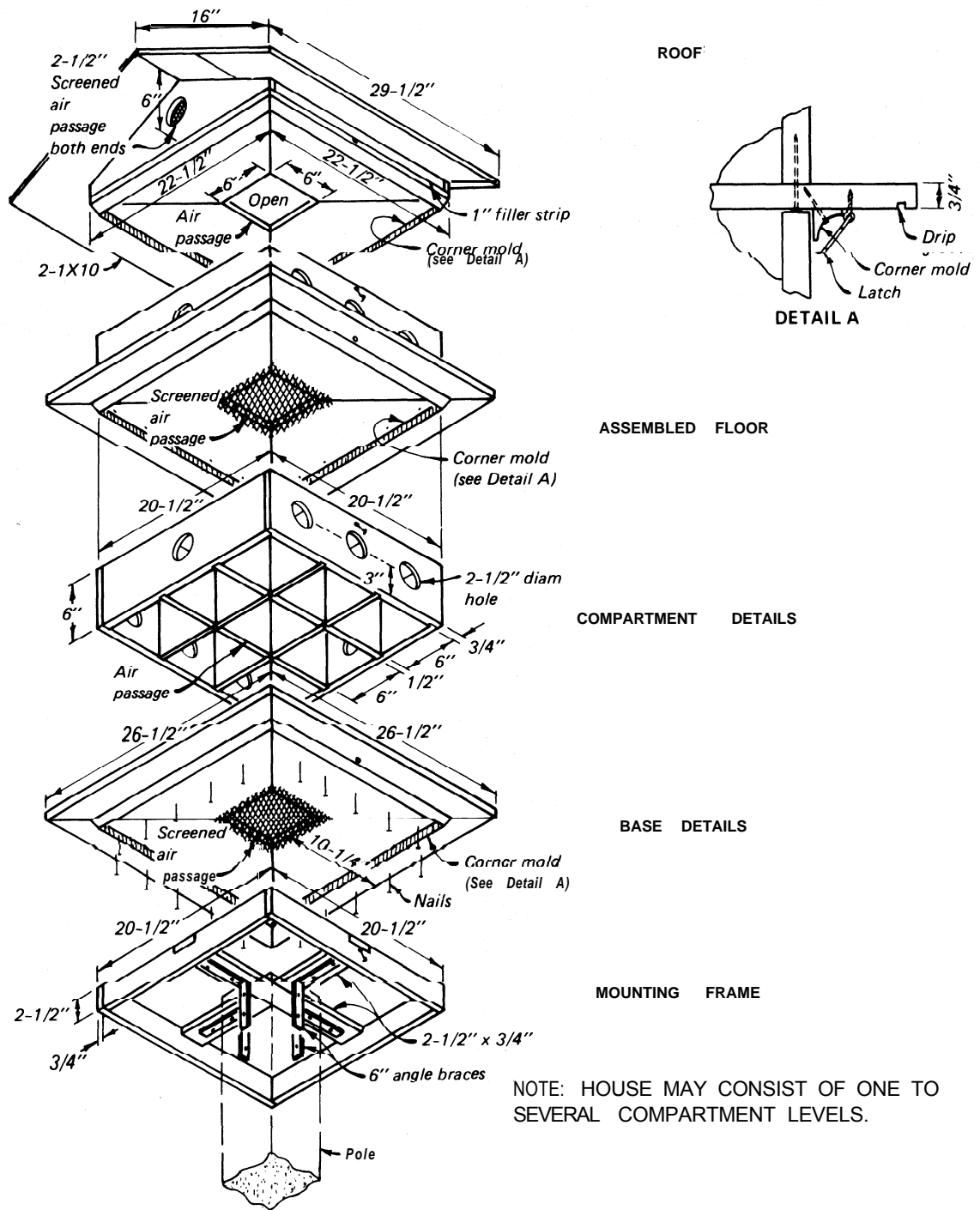


Figure 3. Construction details for a purple martin communal house.

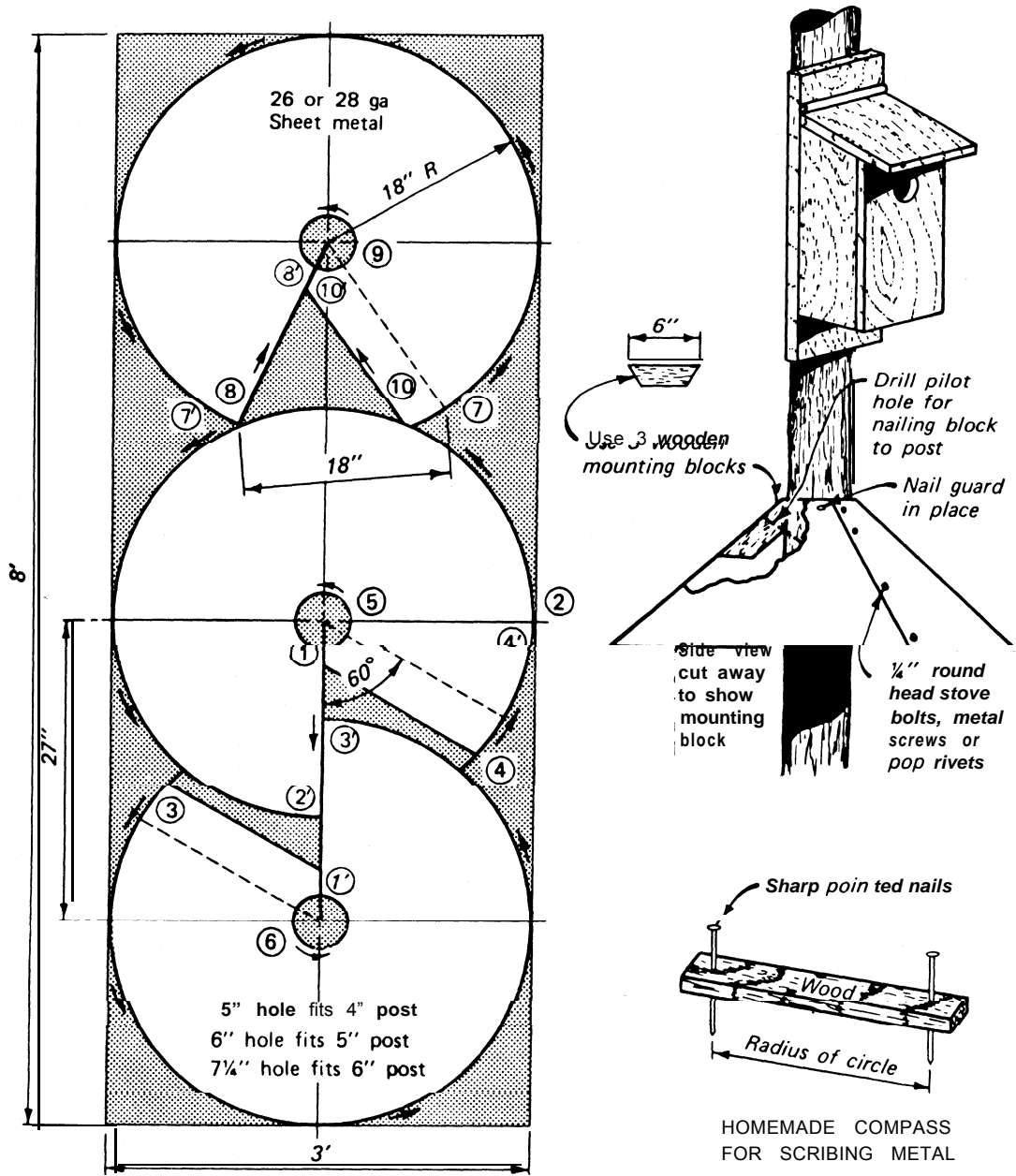
### For More Information

For specific information on managing for songbirds, see *Garden Birds: How To Attract Birds To Your Garden*, by Noble Proctor, Rodale Press.

The songbirds mentioned here are only a few of the many yard-nesting species found in Alabama (see Table 1). To find out more about the nesting requirements and

construction of nest boxes for other native birds see the following publications:

*Building Birdhouses And Bird Feeders: A Family Workshop Book*, by Ed and Stevie Baldwin, Doubleday & Company, Inc.; *Attracting, Feeding, and Housing Wild Birds-With Project Plans*, by Phyllis Moorman, Tab Books Inc.



INSTRUCTIONS:  
 Cut on solid lines only. Follow the numbers; complete each cut before starting the next. For example, cut ① to ① then ② to ②. Make circular cuts in counterclockwise direction. For initial cut at ①, make slot with cold chisel. Cut complete circles at ⑤, ⑥, and ⑨. When installing guard, overlap the cut edge to the dashed line. Three guards can be cut from an 8' x 3' piece of sheet metal.

Figure 4. Construction details for a conical sheet metal predator guard.





CIRCULAR ANR-550

Recommended for Extension use by Lee Stribling, *Extension Wildlife* Scientist, Associate Professor, Zoology and Wildlife Science, Auburn University.

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This publication was written by Karen Fleming, Graduate Assistant, Auburn University Department of Zoology and Wildlife Science. This material was adapted from the following source: Mitchell, Wilma A. 1988. Songbird Nest Boxes: Section 5.1.8, U.S. Army Corps of Engineers Wildlife Resources Management Manual, Technical Report EL-88-19, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Illustrations are adapted from the work of John R. Harris, Scientific Illustrations Section, IPD, under the supervision of Aubrey W. Stephens, Jr.

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**For more information,** call your county Extension office. Look in your telephone directory under your county's name to find the number.

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UPS, 10M17, Rep. 10:96 ANR-550

Rabbit

# Eastern Cottontail Rabbit

*(Silvilagus floridanus)*

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The Eastern Cottontail rabbit is one of the most popular game animals in the country. It is found in many parts of the United States, and in parts of the Northeast and Midwest, it is the number one game species.

Interest in managing rabbits, which changes with the number of hunters and rabbit-dog trials, has generally been high in the Southeast. Although hunter numbers and rabbit harvests in Mississippi have declined over the last decade, around 60,000 rabbit hunters have harvested about one-half million rabbits annually over the past few years.

## Populations

Late winter populations are mainly rabbits born the previous summer. About 20 percent are 2 years old, and about 8 percent are 3 years and older. The chance that wild rabbits will live to be 4 years old is slight.

Predators such as bobcats, foxes, hawks, and owls are probably the rabbit's worst enemies. Other population controls include bad weather and disease. Hunter harvest removes animals that would normally be taken by predators or some other deadly factor.

Many forces work against the rabbit, but populations are strong. Although rabbit populations are often greatly reduced, rabbits can reproduce prolifically. This lets populations build rapidly when you provide the right food and cover.

## Nesting

During the February-September reproductive season, rabbits produce an average of four young per nest, though the number in a nest may range from one to more than seven. Female rabbits dig cup-shaped holes in which to bear young.

Nests have been found in diverse locations from open ground under tall pines to corners of lawns, with the only hiding thing being soft grass and fur from the mother's breast. Generally, however, rabbits prefer to nest along the edges of fields, ditch banks, and other areas of low cover where the nest is hidden, while the mother feeds and rests nearby. She returns to the nest only to nurse her young, usually in early morning and late afternoon.

Young rabbits begin to make short trips from the nest when they are about 10 days old. When they are about 2 weeks old, they leave the nest for good.

## Range

Cottontails seldom range more than one-half mile and usually spend their lives on 10 acres or less.

## Food Habits

Rabbits eat most plants and eat nearly anything that grows above ground. In the growing season, they eat lots of grasses, sedges, sprouts, and leaves. They also eat fruits, branch tips, buds, and bark, along with waste grain around farmed areas.

## Management

The cottontail rabbit is mainly a farm animal and does best on fairly small cropland areas. Usually, grown-up fence rows, ditch banks, and turnrows on farms provide adequate cover. For the past several decades, farm sizes have increased and "clean farming" has increased, as a result of better equipment. Also, much farmland that was once suitable for cottontails has been changed to improved pasture or loblolly-pine plantations. These enterprises are important, but they do not produce

as many rabbits as when rows were being plowed with mules.

Generally, varying habitats for cottontail rabbits is important, such as mixing cover areas with feeding areas. Good cover is probably the greatest one factor affecting rabbit populations. Cover provides areas for rabbits to escape from predators, nest, feed, and avoid bad weather. You can usually develop and maintain cover, depending on the type of landscape involved. Where natural cover is lacking, such as in large, clean agricultural fields, you can increase cover by letting natural vegetation along fencerows and ditchbanks grow up into thickets. You can also plant 15-foot-wide strips of Kobe or Korean Lespedeza.

Rabbits are helpless at birth, so it is important that you avoid bush-hogging, disking, and burning during the nesting season, particularly in areas of suitable nesting habitat. But strip disking, bush-hogging, and burning fields on a 4- to 5-year rotation can increase food production and woody winter cover. You can break up thick broom sedge fields of several acres by planting evergreens, and around field edges and in the forest, fell trees to the ground carefully, leaving trees attached at the stumps and still alive.

With forestland areas, it is important to keep stands open, so you can keep early successional stages at ground level. Young pine plantations provide excellent cover, and later on, burning these stands can produce excellent quality forage.

Keeping different ages of various timber stands, mixed with open fields, areas of thick cover, and succulent green forage helps produce more woodland rabbits.

In winter, rabbits eat oats, winter wheat, clovers, and other green foods planted next to ground cover. These plantings reduce the distances rabbits have to move to find food and reduce predation.

## General Tips for Improving Rabbit Habitat

- Create small stands (10 to 20 acres) close to fields, swamps, and streams.
- Thin pine stands frequently (3 to 5 years) to stimulate understory growth.
- Use prescribed burning in pine types in winter.
- Control predators where trapping and game laws allow.
- Keep pets (cats and dogs) confined, especially during nesting.

Squirrel

# Tree Squirrels in Mississippi

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The eastern gray squirrel and fox squirrel are rodents belonging to the family *Sciuridae*. We think the gray squirrel, *Sciurus carolinensis*, and the fox squirrel, *Sciurus niger*, came to North America from the Old World by way of the ancient land bridge across the Bering Straits (which now separates Alaska from Siberia). Today we find squirrels in Europe, Asia, Africa, North America, and South America.

The gray squirrel is often called "the cat squirrel" because of its "cat-like" call. The fox squirrel is sometimes called "red squirrel." But that is confusing, because there is the "red squirrel," *Tamiasciurus sp.*, of the western states. The fox squirrel probably got its name because its color is similar to that of a fox.

The gray squirrel has a head and body 8 to 10 inches long, with a hairy tail of 7 to 10 inches. Some gray squirrels have weighed up to 1½ pounds, although they average just slightly over 1 pound. Mostly they are grayish, but some are black or albino. Although color phases may vary, Mississippi has only one subspecies of the gray squirrel, *S. carolinensis*. In Mississippi most black squirrels are fox squirrels, although you may find some black "gray squirrels." These are common in some northern states.

The fox squirrel is larger than the gray squirrel, weighing about ½ to 2½ pounds. It reaches a body and head length of 10 to 15 inches and has a tail length of 9 to 14 inches. It has a black-brown-orange color combination, which makes up a common grizzled rusty color. We see two subspecies of the fox squirrel in Mississippi. One, *S.n. bachmani*, has the black mask and white nose, ears, and paws of fox squirrels common to uplands across Mississippi.

The other, *S.n. subauratus*, lives at the western border of Mississippi along the Mississippi River. The subspecies *S.n. subauratus* has two color phases. One is a glossy black phase, and the other color is a grizzled rusty phase, often lacking the black mask and white appendage coloration characteristic of the upland fox squirrel, *S.n. bachmani*.

Fox squirrels in Mississippi have two distinct color variations. One is the white nose and ears common on fox squirrels of the pinelands, and the other is the glossy black fox squirrels common to the Mississippi River Delta. The black squirrel is a color phase of our Delta fox squirrel.

At times, the question arises as to whether a squirrel is a gray or fox. The gray squirrel normally has white tips on the long tail hairs, while the fox squirrel's tail is tipped with rusty orange or dark hairs. A gray squirrel's head is more rounded than a fox squirrel's, and its ears are long and more pointed. Color of the paw sole also varies between gray and fox squirrels. Gray squirrel's paw sole color is pinkish, while paw sole color of the fox squirrel is black.

Some of the most distinguishing characteristics between gray and fox squirrels are in the skeletal features. The gray squirrel has a smaller skeleton and tiny teeth in front of the premolars of the upper jaw. After cooking, the bones of gray squirrels are white, while fox squirrel bones are pinkish-orange.

## Family Life

Research indicates two major breeding and rearing seasons, although some young are raised throughout the year in Mississippi. The first litter of young is normally born

from January through March, and the second litter follows from June through August.

Studies also found spring-born females are likely to bear a spring litter the following year and skip the summer breeding period. A summer-born female normally does not breed in the spring but has a litter the following summer. Most adult females raise two litters per year. The summer rearing season is usually more successful.

Mating habits indicate gray squirrels are promiscuous, while fox squirrels prove to be monogamous (having one mate). The gestation period is 45 days for fox squirrels and 44 days for the gray squirrel. A normal litter contains about three young. Male squirrels usually do not participate in family affairs after mating.

Spring breeding depends heavily on the quantity and quality of food available in autumn and winter. Often a good mast crop is followed by a good squirrel crop. This is one reason there are ups and downs in squirrel numbers.

The blind, deaf, and hairless litter is born in trees, either in hollowed den trees or in nests built of leaves and twigs. Gray squirrels weigh about ½ ounce at birth, are half an inch long with no teeth, and have closed ears and eyes. Fox squirrels when born are pinkish-purple, and their "vibrissae," or whiskers, stand out.

Late in the fifth week, the baby squirrel has a full coat of new body hair. At about 6 weeks of age, it wanders about the den, eating young leaves and buds. The mother starts weaning the young in the seventh week and continues until the squirrels are about 10 to 12 weeks old. The average lifespan for squirrels in the wild is about 18 months.

## Parasites and Diseases

Squirrels are usually hardy little animals, and parasites and diseases worry hunters probably more than the squirrels. Botfly larvae (or "wolves") may be the most common pest in the South but seldom occur in the North. Mange, or "scabies," is a skin condition that causes bald spots on squirrels. It normally occurs more in late winter and early spring and is not as severe in healthy animals with a good food supply. Squirrels also commonly have ticks, fleas, chiggers, and warty growths (fibroma), but these usually aren't serious.

Occasionally we find rabbit fever, tapeworms, roundworms, internal protozoa, and other rodent pests. Of the predators, owls, hawks, snakes, foxes, and bobcats are the most pronounced, but they have never proven destructive to a squirrel population and should be kept to prevent overpopulations and diseases. Man, through habitat destruction, has been a more serious enemy than any disease, parasite, or natural predator.

## Habitat and Food

The gray squirrel's habitat needs often differ from the fox squirrel's by requiring denser and larger acreages, away from forest openings. In Mississippi, the fox squirrel is more commonly found on the ridges and in predominantly pine woodlands. The gray squirrel occurs more frequently in the stream or branch bottoms in Mississippi.

Both squirrel species have similar feeding habits. The more desired food (hardwood mast) is important to successful squirrel production. Oaks, beech, and hickories are extremely important food sources for squirrels and offer a high carbohydrate content. Preferred spring and summer foods include ash, elm, gum, holly, hackberry, ironwood, magnolia, maple, mulberry, and pine. Squirrels eat some leaves, and they love buds in early spring. They also eat insects, eggs, seeds, and forbs (weeds).

### Common trees and their relative food values to squirrels

<i>Tree</i>	<i>Value of Fruit</i>	<i>Value of Buds</i>
Ash		Medium
Beech	High	
Black cherry	High	
Dogwood	Medium	
Elm	Low	Medium
Gums:		
black,	High	
Tupelo	High	
Gum: red	Low	Medium
Hackberry	Medium	
Hickory	High	
Locust	High	
Magnolia	Medium	
Maple	Medium	Medium
Oaks:		
white,	High	Medium
red,	High	Medium
water	High	Medium
Pine	Medium	
Red mulberry	High	
Sweetbay	Medium	
Sweet pecan	High	
Sycamore	Low	
Willow		Medium
Yellow poplar	Low	Medium

Squirrels fare best in large acreages of mixed hardwoods that are nearing or at maturity. You cannot keep these conditions indefinitely because of different tree environments and changing forest conditions. Recommended timber management practices include the following:

1. Leave as many large mast-producing trees as possible when cutting.
2. Keep fire out of hardwood bottoms.
3. Control cattle and hogs on forest land.
4. Encourage plants such as cherries, huckleberries, dogwood, persimmon, haws, poison ivy, rattan, muscadine, and grapes.
5. Leave several den trees per acre.
6. Build artificial nest boxes for squirrels. (See MSU-ES Publication 884, "Building Homes for Squirrels.")





Revised by **Dr. Ben West**, Assistant Extension Professor, Wildlife and Fisheries

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Published in furtherance of Acts of Congress, May 8 and June 30, 1914. JOE H. MCGILBERRY,  
Director (POD-02-05)

Turkey



## Eastern Wild Turkey

(*Meleagris gallopavo silvestris*)

by Mary C. Kennamer

NWTF WILDLIFE BULLETIN No.1



NATIONAL WILD TURKEY FEDERATION



PHOTO BY MATT LINDLER



PHOTO BY JOHN HEIDECCKER

*ABOVE: The eastern wild turkey inhabits the eastern half of the United States.*

*RIGHT: The gobbler exhibits the characteristic red, white and blue head, the black-tipped breast feathers and copper/bronze iridescence.*

The eastern wild turkey is the most widely distributed, abundant, and hunted turkey subspecies of the 5 distinct subspecies found in the United States. It inhabits roughly the eastern half of the country. The eastern wild turkey is found in the hardwood and mixed forests from New England and southern Canada to northern Florida and west to Texas, Missouri, Iowa, and Minnesota. It has also been successfully transplanted in California, Oregon, and Washington, states outside its suspected original range.

L.J.P. Vieillot first described and named the eastern subspecies in 1817 using the word *silvestris*, meaning "forest" turkey.

Since the eastern wild turkey ranges the farthest north, individuals can also grow to be among the largest of any of the subspecies. The adult male, called a gobbler or tom, may measure up to 4 feet tall at maturity and weigh more than 20 pounds. Its upper tail coverts, which cover the base of the long tail feathers, are tipped with chestnut brown and tail tips with dark buff or chocolate brown. In contrast, the breast feathers are tipped in black. Other body feathers are characterized by rich, metallic, copper/bronze iridescence.

The primary wing feathers have white and black bars that extend from the outer edge of each all the way to the shaft. Secondary wing feathers have prominent white bars and are edged in white, producing a whitish triangular area on each side of the back when the wings are



*Eastern gobbler wings folded on the back show a whitish triangular patch.*

---

**Eastern wild turkeys are found in 38 states and two Canadian provinces. It is the most abundant of the five subspecies found in the U.S. and Canada.**

---

folded on the back.

A mature female, called a hen, may be nearly as tall but is usually lighter, weighing between 8 and 12 pounds. Females are similar in color to the males but more brown, and the metallic reflections are less brilliant. Feathers of the hen's breast, flanks, and sides are tipped with brown rather than the black tips of the male. The head of the female is considered feather covered with smaller, dark feathers extending up from the back of the neck. Females lack the caruncles or fleshy protuberances of skin at the base of the front of the neck that are bright red on the male. Beards and spurs are generally considered secondary sex characteristics in males. Beards may be present on about 10 percent of the hens, however, they are thinner and shorter than those of adult males. Spurs on hens are uncommon but, when present, are usually rounded and poorly developed.

The reproductive cycle for the eastern wild turkey usually begins in late February or early March in its southernmost habitats but not until April in northern states such as Vermont and other areas across the northern edge of turkey range. Likewise, the cycle is complete with the hatching of poults by June

or as late as mid-summer further north. Birds that reneest may bring off broods as late as August.

Breeding behavior is triggered primarily by the increasing day length in spring, but unusually warm or cold spells may accelerate or slow breeding activity. This behavior begins while birds may still be in large winter flocks prior to separating as individuals or into small groups.

The basic social organization of these flocks is determined by a pecking order with the most dominate bird at the top and the least on the bottom. Males and females have separate hierarchies, and there can be pecking orders within and between flocks of the same sex; while stable pecking orders within flocks of the same sex seem to be common to all wild turkey subspecies. Turkeys have home ranges, not territories where individuals defend space within a given habitat from other members of the same sex. Instead they fight for dominance recognizing individuals within the pecking order while sharing overlapping home ranges.

Courtship behavior patterns include gobbling and strutting by the males. Gobbling attracts hens to males who court the hens by strutting. If the hen selects the gobbler for mating she crouches, which signals the male to copulate. The first peak of gobbling activity is associated with the beginning of the breeding period when gobblers are searching for hens. The second peak occurs a few weeks later, when most hens begin incubation.

Hens become secretive while searching for a site to nest prior to laying eggs. Laying hens may continue to feed with other hens and mate with gobblers, but this social activity will be away from the nest site.

Nests are shallow depressions formed mostly by scratching, squatting, and laying eggs rather than by purposeful construction. The arrangement of twigs and leaves is minimal in sites chosen for their moderately dense understory which still allows the hen a view

but gives protection from avian predators.

Laying a clutch of 10 - 12 eggs takes about 2 weeks and unincubated eggs are usually covered with leaves. Continuous incubation begins about the time the last egg is laid at which time the hen no longer tries to conceal her eggs when she leaves for short periods to feed.

The hen will incubate for 26 - 28 days sitting quietly and moving about once an hour to turn the eggs. Actual hatching begins with pipping—the poult rotating within the shell, chipping a complete break around the large end of the egg. Hens respond to the pipping sounds by making soft clucks at random, a form of communication which begins to imprint the poult to the hen as she inspects the eggs and turns them. Damp poults clumsily free themselves from the egg but are fully dry and coordinated so they can follow the hen away from the nest within 12 to 24 hours after hatching. This vocal communication between hen and poults still in the eggs is an important part of the hatching process and is critical to survival of the young.

Imprinting is a special form of learning which facilitates the rapid social development of the poults into adults. It's a strong social bond between the hen and her offspring which occurs up to 24 hours after hatching. Imprinting describes the rapid process by which the young poults learn to recognize their species, essential for their survival. It happens only at this time and cannot be reversed.

Day-old poults learn to respond to the hen's putt or alarm call before leaving the nest and respond by freezing or running to hide beneath her. The hen, clucking almost continually, slowly leads her poults away from the nest until within a few hours her pace is

more normal. By now the poults have formed into a brood group that is constantly feeding by pecking at food items, a behavior learned from their mother.

By the second day out of the nest, wild turkey poults are performing most of the characteristic feeding, movement, and grooming behavior patterns. By the end of the first week they are regularly dusting with the hen. By their second week they are able to fly short distances and at the third week they are able to roost in low trees with the hen. The ability to roost in trees is an important event in the brood's development as it removes them from the danger of ground predators. Roosting occurs at the beginning of another phase of rapid development, the acquisition of juvenile plumage and a change in diet from predominantly insects to a higher percentage of plant matter. This phase of behavioral and physical development is



PHOTO BY LARRY PRICE

*An eastern hen, darker and duller than the gobbler, with 3 poults about 2 weeks old.*

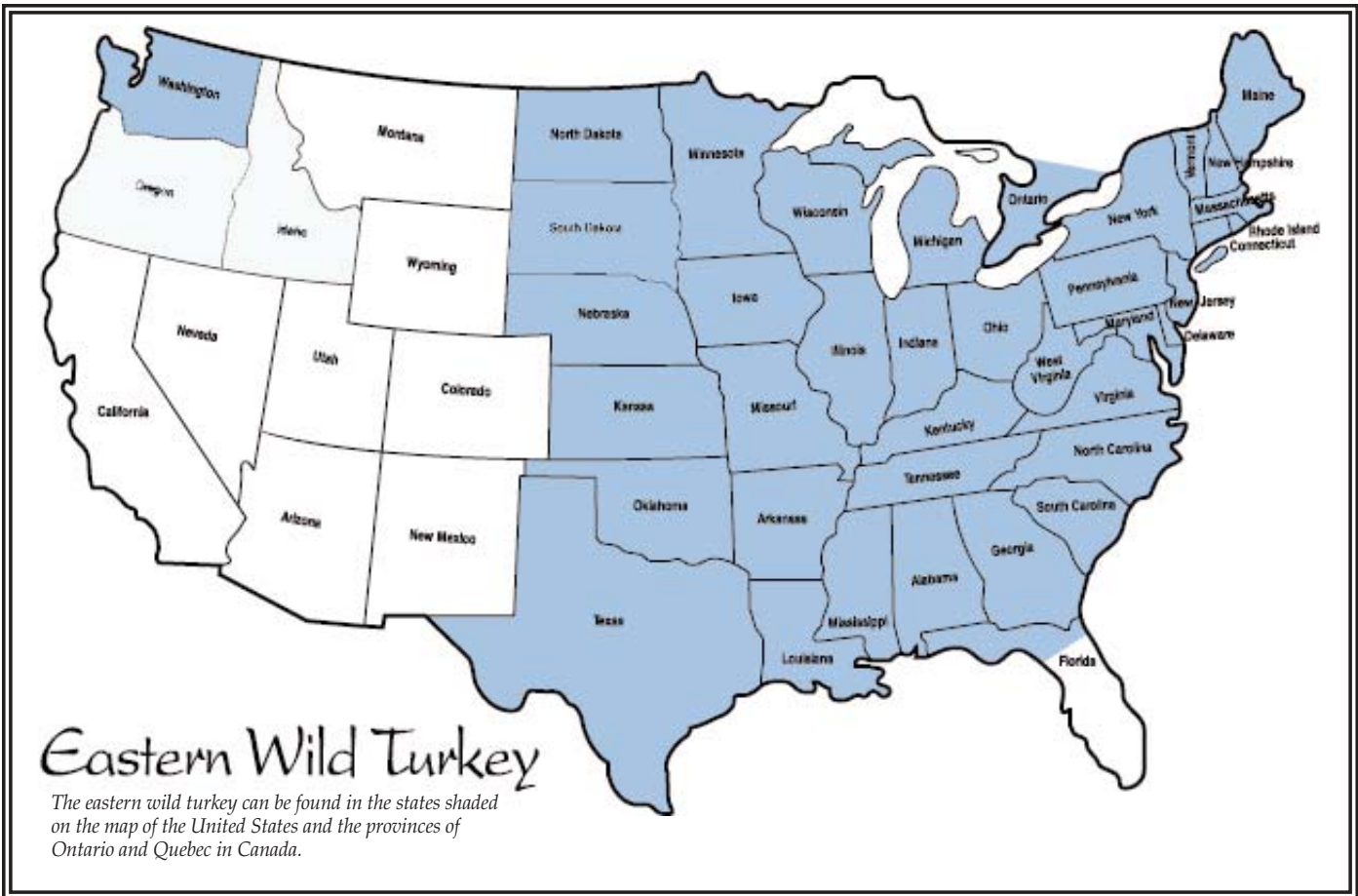


PHOTO BY BILL KINNEY

accompanied by a sharp decline in poult mortality. Poults that survive the first six weeks have a much better chance of surviving to adulthood.

At age 14 weeks, male and female poults are distinguishable by body size and plumage. They have formed separate pecking orders although still dominated by the hen until all males have finally

*Courtship behavior patterns include gobbling and strutting by males which, because of the wide distribution of the eastern subspecies, can occur when there is still snow cover.*



left the brood group to form their own social units.

By fall, the pecking order of the sibling groups has been established and the young flocks are ready to enter the social organization of the surrounding population. The body growth of juveniles ends by the beginning of winter when the flocks, separated by age and sex class, settle into winter range.

For additional information on this subject refer to **The Wild Turkey Biology and Management**, edited by Jim Dickson. The book is available for \$59.95 from the

National Wild Turkey Federation, by clicking [here](#) or calling 1-800-THE-NWTF.

The **Get in the Game CD-ROM** is also available through the NWTF's online Turkey Shoppe. This CD includes a planting guide and valuable information to help you attract wild turkeys to your land. Ordering information can be found [here](#). And to check out more about the NWTF's **Wild Turkey Woodlands** program to help landowners and hunt clubmembers manage their land for wildlife, click [here](#).

## Silvopasture and Eastern Wild Turkey

### Introduction

Trees and livestock account for much of the income production on lands throughout the southern United States. Today many landowners are combining these two operations into one system called silvopasture, where both timber and livestock are produced on the same field.

While economic gain is most often the primary goal of a silvopasture system, wildlife habitat enhancement is commonly seen as an added benefit. This *Agroforestry Note* discusses the habitat requirements of Eastern wild turkey with respect to management considerations for the production of timber and livestock forage within silvopasture systems.

Silvopasture systems typically are laid out by either planting widely spaced rows of trees (usually pines) onto an open pasture or by heavy thinning of a forest to allow sufficient light to reach the ground so that a livestock forage system can be established. See *Agroforestry Notes* 18 and 22. Minor modification can be made to greatly improve the value of a silvopasture system for wild turkey, while still retaining most of the timber and forage production potential.



**Silvopastures provide a mix of tree and grass vegetation that is preferred by wild turkeys.** Photo courtesy National Wild Turkey Federation.

### Habitat Requirements

The effective range of a flock of Eastern wild turkeys can span several thousand acres, depending upon the available food and habitat conditions, and occasionally may exceed 12,000 acres. Because of this large range and the relatively small scale of most silvopasture operations it is unlikely a silvopasture or, for that matter, most farms in the Southeast will fulfill the year-round habitat requirements for Eastern wild turkeys. Silvopastures, however, can be managed to provide significant requirements and help improve the conditions for the turkeys.

#### Food Species for Eastern Wild Turkey

Trees	Shrubs	Grasses / Forbs	Vines
pine	crabapple	chufa / sedges	honeysuckle
oaks	dogwood	native grasses	Virginia creeper
persimmon	hawthorn	Bahiagrass	poison ivy
pecan	American beautyberry	legumes / clovers	grapes
hackberry	blueberries / briars	orchardgrass	

Turkeys require a mixture of open agricultural and forest land. While turkeys prefer oak forests, they will utilize most types of timber found in the east and prefer mature open grown timber. Sawtimber stands with a basal area of 40 to 60 square feet can allow enough light penetration to provide good foraging in the understory.

Each year, turkeys go through three distinct periods or seasons each requiring somewhat different habitat conditions. These conditions are:

- Spring (nesting)
- Summer / fall
- Winter

### Spring (Nesting) Habitat

An ideal nesting site is an area where the ground cover has a woody component of shrubs, small trees, and briars usually less than four feet in height with a strong herbaceous component. The vegetation is often adjacent, or in close proximity, to water such as a pond, spring stream, or livestock tank. Riparian areas, small clearcuts, open grown forests, old fields, or pastures and hayfields where grazing is deferred during March through June, are often used as nesting sites.



**Allowing shrub clusters to persist creates turkey nesting cover.**

#### **Management considerations for silvopasture to enhance spring (nesting) habitat:**

- Manage trees for an open-grown canopy of between 25 to 45 percent cover or grow trees in two or three row sets with 30 to 40 foot alley ways.
- Establish understory vegetation to native warm season grass and defer utilization until July, or if grazed, manage for a grazing height of 8 to 10 inches.
- And/or manage understory to increase shrub and briar component to improve nesting condition. This will usually require shifting 20 to 30 percent of the forage production to shrubs.

### Summer / Fall Habitat

Vegetation at this time of the year is more varied and diverse. Once young turkeys hatch, they move to grassy areas and for the first month feed almost exclusively on insects. High quality pastures and recent forest clearcuts are excellent areas for the young turkey to grow. Within approximately one month their diet begins to mimic the adults and include soft and hard mast, and forages, such as grasses and legumes. These conditions are found near forests and in open grown forests containing at least 50 percent light penetration to the forest floor for understory production and an overstory containing oaks and soft mast producing trees. Thinned pine forest also provides ideal turkey habitat.



**Rotational grazing creates a variety of forage stand conditions. Silvopastures with shorter forage are excellent brood rearing and feeding areas for young poults. Taller vegetation is good if there is enough open area to allow poults to access the site.**





**Existing or established motts (clusters) of oak trees scattered within the pine stand produce acorns which benefit turkeys.**

**Management considerations for silvopasture to enhance summer / fall habitat:**

- Establish motts (clusters) of oaks or soft mast producing trees in linear silvopasture planting (see photo above).
- Protect mast producing tree and shrub species, and manage them to comprise 10 to 30 percent of the stand.
- Establish shrubs within, or adjacent to, linear tree sets in silvopastures (see photo above).
- Maintain legumes as a forage component for grazing and wildlife.

**Winter Habitat**

During this critical time of the year, winter habitat must provide adequate and reliable food, plus cover from inclement weather. Mature hardwood trees preferably oaks are ideal. Oaks provide roosting sites and acorns for food. Riparian areas near or in silvopastures, left in oaks, as well as managed hardwood sites, provide excellent winter habitat. If a significant area of oak trees is not available for winter food, crop residue or food plots adjacent to wooded areas can be established to assure a good food supply.

**Management considerations for silvopasture to enhance winter habitat:**

- Maintain 10 to 30 percent oak species in block-type silvopasture plantings.
- Establish motts of oak species in linear silvopasture plantings.
- Plant desirable cool season perennial grasses for winter foraging where adaptable.
- Over seed warm season grasses such as bahiagrass and Bermuda grass to wheat or annual rye grass for winter grazing by livestock and foraging by turkeys.
- Over seed adapted cool season legumes for winter and early spring foraging.

Silvopasture forage can be enhanced to provide additional high quality winter feed for turkeys. Adding cool season grasses or legumes in silvopastures near streams and oak motts create a food source close to other habitat components.

**As silvopastures mature, they provide a variety of habitat requirements that turkeys will utilize at different times of the year depending on the habitat requirements that are being satisfied.** Photo courtesy National Wild Turkey Federation.





**An inventory of turkey habitat conditions near the silvopasture area will indicate which management alternatives will best enhance the area for wild turkeys.** Photo courtesy National Wild Turkey Federation.

### **Additional Considerations**

Before deciding what management changes are needed, a landowner should:

- Consult a professional wildlife biologist trained in wild turkey and silvopasture management.
- Inventory the habitat condition of the silvopasture, the farm, and adjoining farms that make up the range of the turkeys in the area.
- Keep in mind that turkey diets are varied. Any one food source is not a limiting factor for quality turkey habitat. Furthermore, turkeys respond to vegetation structure as much as, or more than, availability of specific food items.
- Determine grazing, timber, wildlife and other conservation and production objectives for the pasture, forest and silvopasture on the farm.
- Develop a management plan to meet landowner objectives.

### **Additional Information**

Wildlife Management: Eastern Wild Turkey; 2003; by Bob Tjaden; College of Agriculture & Natural Resources, University of Maryland. FS-606. pgs 10.

Wildlife Food Planting Guide for the Southeast, Dean Stewart, Mississippi State University Extension Service Publication 2111.

Turkey Management in Pine Plantations, 2004. by John S Powers, Area Biologist, Division of Wildlife and Freshwater Fisheries. [http://www.conservation.alabama.gov/administrative/Turkey\\_Management.htm](http://www.conservation.alabama.gov/administrative/Turkey_Management.htm)

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Contact: USDA National Agroforestry Center (NAC), East Campus-UNL, Lincoln, Nebraska 68583-0822. Phone: 402-437-5178; fax: 402-437-5712; web site: [www.unl.edu/nac](http://www.unl.edu/nac).

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# Wild Turkey Management In Alabama

The wild turkey thrives as a classic example of wildlife management success. During the Depression years, wild turkeys numbered fewer than 10,000 in Alabama and were restricted to scattered pockets of isolated habitat. In the short time since then, restocking of suitable habitat, protection, and management have allowed turkeys to respond dramatically to favorable land-use changes. Wild turkeys now occupy portions of all 67 counties in Alabama and may exceed 300,000 in number.

## Life History

During fall and throughout most of winter, wild turkeys gather in flocks. Flocks are usually distinct units comprised of adult and young hens, adult gobblers, or, by mid-winter, young gobblers. Large flocks, often referred to as droves, are more common in western races of the wild turkey than in the eastern subspecies found in Alabama.

Stimulated by warming temperatures and increasing daylight, flocks begin to break up during late winter and early spring. Young gobbler groups, however, may remain together throughout their first spring.

In preparation for nesting and rearing their young, hens typically disperse to areas containing openings or fields. Adult gobblers establish loose, poorly defined ranges near such areas and call or gobble to attract hens for mating.

Breeding is promiscuous. Gobblers may mate with several hens and hens may mate with more than one gobbler. Some young gobblers reach sexual maturity during their first spring, but very few mate until the following year.

Although some egg laying occurs during March, most hens begin nesting during April. A clutch of about 10 eggs is laid in a shallow, leaf-lined depression on the ground. Twenty-eight days of incubation are required for the eggs to hatch.

Hens assume all incubation and brood-rearing responsibilities. On the average, fewer than 50 percent of all nests are successful. If initial nests are

destroyed or abandoned, hens often attempt to nest again.

The young, known as poults, are covered with natal down at hatching. Although immediately able to run about and feed themselves, they require brooding by the hen to keep warm.

Poults feed heavily on insects and other high-protein matter during their first few weeks of life (Figure 1). Poults mortality averages nearly 70 percent with the majority of that loss occurring by two weeks of age.

The growth of poults is rapid. By three to four months of age, the young are almost indistinguishable from adults. By this time, young gobblers usually outweigh and stand taller than adult hens. By fall, hens and their broods join other such groups-as well as unsuccessful hens-to form new flocks.

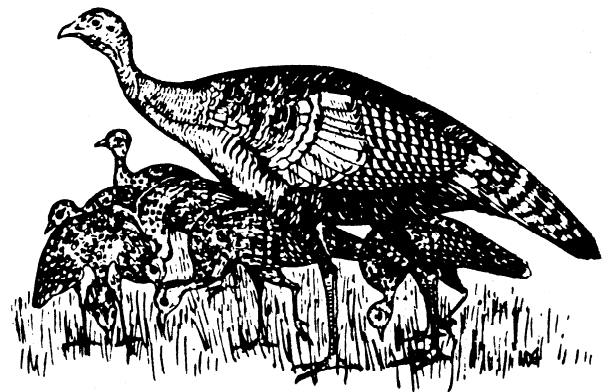


Figure 1. Wild turkeys feeding in low-growing vegetation.

## Habitat Needs

Annual home ranges of wild turkeys often exceed 1,000 acres. Range size in Alabama is related to the amount, availability, and condition of critical habitat components. Turkeys in poor habitat may range over several thousand acres annually.

Extensive tracts of land are needed to retain large populations of turkeys year-round, but

turkeys can be attracted to small holdings for the hunting season.

Ideal habitat is difficult to define. Given good protection, turkeys can adapt to several habitat types and conditions. A good range consists of predominantly mature, mixed pine-hardwood stands, interspersed with field and grassy openings.

Habitat for turkeys must offer sufficient sources of seeds, nuts, and other energy-rich food sources during fall and winter. Mast of hardwoods, particularly oaks, is used extensively during this time (Figure 2).

Dietary preferences shift to leafy vegetation, animal matter, grass seeds, and soft fruits during spring and summer. Much of these needs are satisfied by feeding in fields, forest openings, and around the edges of such habitat types.

Hens prefer to nest in brushy areas that offer good cover. Nesting covers and protective covers for adult turkeys are usually plentiful in Alabama. However, protective cover for poults can be critically limited. The survival of turkey broods is influenced by the quality of habitat used.

Broods less than two weeks old need access to areas that give good overhead cover and protection from predators. Broods in good habitat experience fewer losses than those in poor habitat. Excellent habitat for young poults would be fallow fields and woodlands with an open canopy that allows plants to grow at ground level.

Turkeys require water almost daily, but they satisfy much of that need by eating succulent vegetation and fruits. Access to water does not limit turkey distribution or abundance in Alabama.

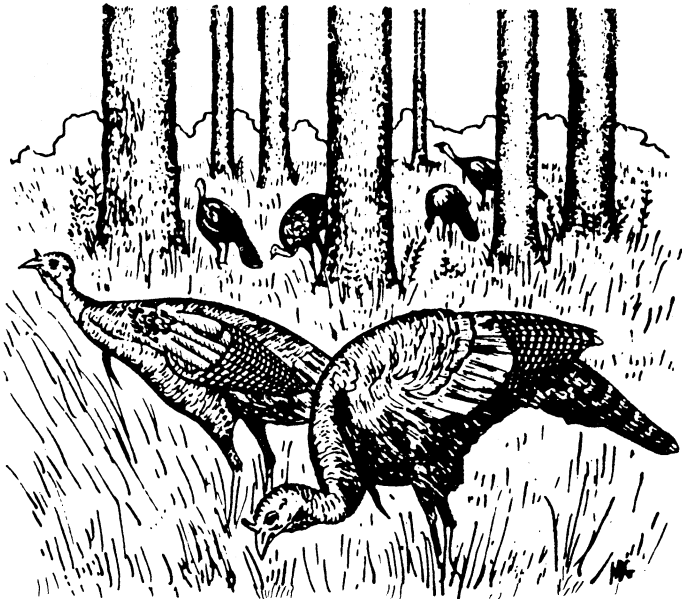


Figure 2. Adult turkeys in mature hardwoods.

## Habitat Management

To increase the number of turkeys on a tract of land, you must first evaluate the present abundance and quality of habitat types on the property. Because turkeys are mobile, also consider the land types and usages of adjacent properties. For example, if adjoining lands are dominated by unbroken stands of mature hardwoods, few turkeys could be attracted by managing your land similarly. Instead, you would benefit most by providing openings and other habitat types.

No precise rules govern the minimum amount or proportions of particular habitat types that must be available to turkeys. For example, turkeys may thrive on some areas with a low hardwood component if other areas, such as pine stands or food plots, are managed to meet or supplement fall and winter food needs (Figure 3).

The following are general guidelines to consider when managing land for turkeys.

**HARDWOOD MANAGEMENT.** Retain a variety of mature, mast-producing hardwoods. Stands of such types should be well distributed over the area. Cutting rotations for hardwoods should extend at least 70 years on most sites. If thinning, select against hickories, sweetgums, and poplars, while retaining beeches and oak groups. If mature hardwoods cover less than 25 percent of an area, do not cut hardwood stands unless equal or greater portions than that scheduled for cutting are entering mast-producing stages.

**PINE MANAGEMENT.** Short rotation (pulpwood management over extensive areas leaves little prospect for wild turkeys. However, high densities of turkeys may exist on large tracts managed primarily for pine saw timber. Restrict pine management to sites best suited to pine production. Leave hardwood-dominated drains and stream bottoms uncut when harvesting or establishing pine stands.

Thin pine stands liberally as needed. Prescribe burn as soon as the tree height in young stands allows safe burning. Continue using fire on a three- to five-year cycle on pine sites. In relatively large stands, divide each stand into burn compartments so that one-third to one-fifth of the stand can be burned annually. Further benefits may be achieved by burning some stands annually and by permanently excluding fire from others.

Burn woodlands during winter but avoid burning later than March 15 to prevent nest destruction. Ideally, fire should be used early enough to allow ample germination or green-up by the time flocks disperse.

The Alabama Forestry Commission provides technical assistance on fire use and can help with

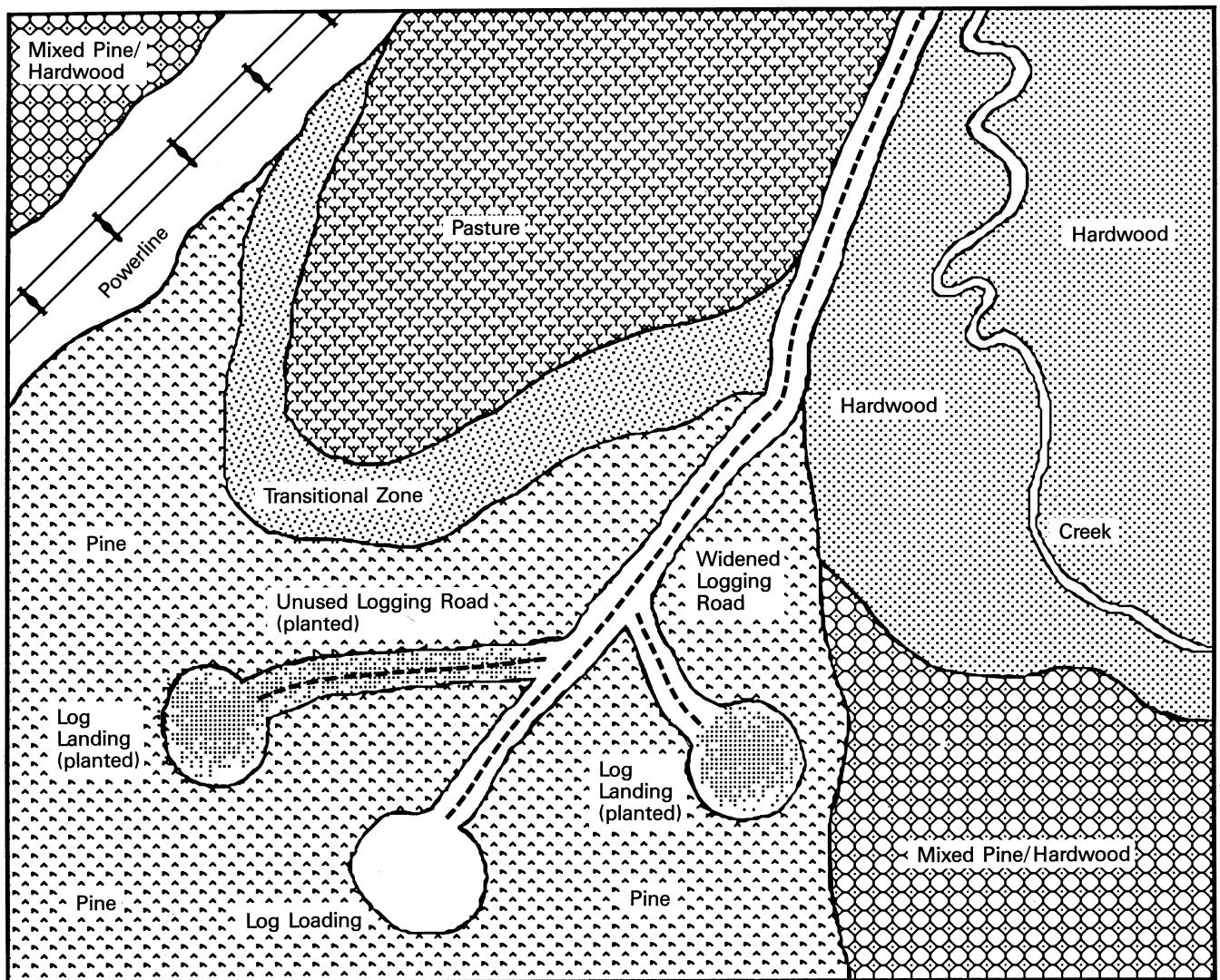


Figure 3. Habitat types for wild turkeys.

the construction of fire containment lanes.

**MANAGING OPENINGS.** High densities of turkeys rarely occur where fields or forest openings are absent or scarce. Turkeys may thrive where openings comprise as little as 5 percent of the total area and as much as 50 percent. To retain turkeys throughout the year on heavily forested land or to attract them during spring, provide openings of 5 to 20 acres. Long, narrow openings are provided by utility right-of-ways or by widening logging roads.

Improved pastures provide excellent feeding areas for hens and older poults. Mow ungrazed or lightly grazed openings during mid-summer to stimulate new growth and to prevent such areas from becoming too thick or rank for turkey use.

Field edges should provide a subtle transition from woodland to opening, allowing poults to have access to cover when feeding in fields (Figure 4). This can be done by thinning trees along field

edges or allowing edges to revert to brushy cover. If fields or pastures are heavily grazed, build fences several yards out from the woodlands to prevent cows from cleanly grazing field edges.

**SUPPLEMENTAL PLANTING.** Plant food plots to supplement native foods and to attract or retain turkeys during specific seasons of the year. Plots should be well distributed and located in or near woodlands. Where turkeys and deer are abundant, plots of at least 1 acre are needed. Corn, chufa, soybeans, and grain sorghums are planted exten-



Figure 4. Good transition from field to forest.

sively to supplement fall and winter foods of turkeys. Vetch, rye, wheat, clover, and oats provide winter grazing for turkeys.

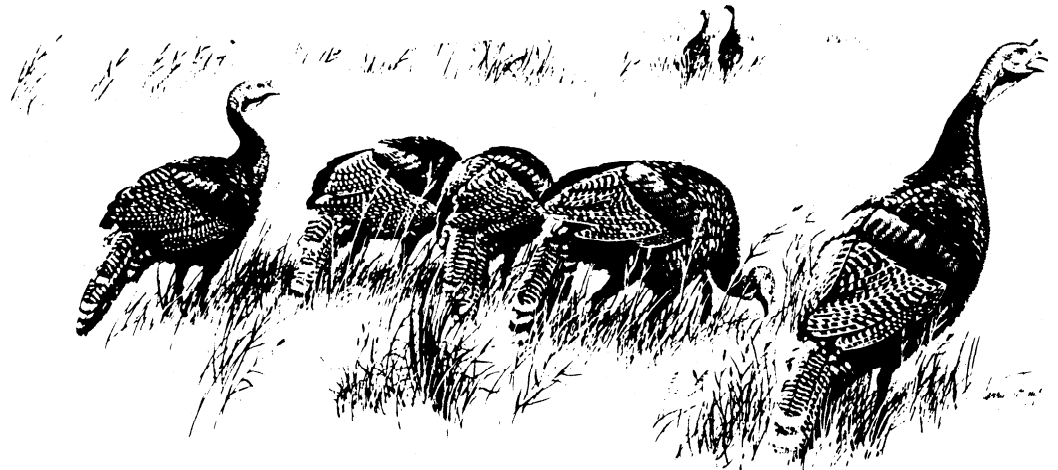
Seeds of bahiagrass and browntop millet are used heavily during summer (see table below). Refer to Extension Circular ANR-485, "Wildlife Plantings And Practices," or ask your county agent for information regarding suitable varieties, planting dates, and planting methods.

**Food Plants Beneficial To Turkeys In Alabama.**

Plant	Period Used	Planting Dates
Corn	Fall-Winter	March 15 - May 1
Chufa	Fall-Winter	May 1 - June 30
Soybeans	Fall-Winter	May 15 - July 15
Grain sorghums	Fall-Winter	June 1 - July 1
Vetch	Winter	Sept. 1 - Nov. 1
Rye	Winter	Sept. 1 - Nov. 15
Wheat	Winter	Sept. 1 - Nov. 15
Clover	Winter	Sept. 1 - Oct. 30
Oats	Winter	Aug. 25 - Oct. 30
Bahiagrass	Summer	Mar. 1 - July 1
Browntop millet	Summer	April 1 - Aug. 15

**PROTECTION.** Turkeys can adapt to widely varying conditions. Given adequate protection, large turkey populations may exist in marginal habitat. Poaching, however, may limit population growth in very good habitat. Restrict access to lands managed for turkeys and erect gates at the entrances of all access roads to discourage unnecessary traffic.

Minimize disturbances to hens during nesting and brood rearing. Pen or remove free-ranging dogs. Where possible, delay cutting timber and mowing fields until July once nesting begins. If fallow fields are scheduled for cultivation, plow them before nesting activity begins.



**Lee Stribling**, *Extension Wildlife Scientist*, Associate Professor, Zoology and Wildlife Science, Auburn University

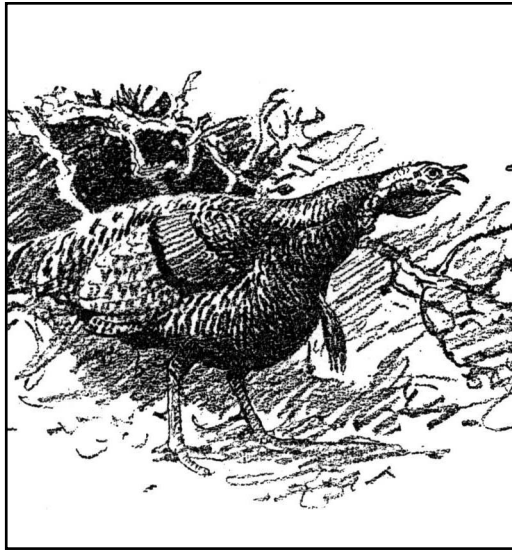
**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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# Forest Management for Wild Turkeys

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Wild turkeys require a variety of habitat types, including forests, open lands, and old fields. Adequate forestland is critical to maintaining viable populations of wild turkeys, particularly when forest management provides a mix of different forest types and ages and openings that can provide various food sources, brood rearing habitat, edges for nesting, and room for courtship. Turkeys do well in forested landscapes with 15 to 65 percent openings, whether in fields, cropland, pastures, or early successional stages of forestland.

## Seasonal Habitat Needs

### *Nesting (Spring)*

Turkey hens nest in a variety of habitat types, including pine forests and young cutovers/regeneration areas, old fields, hay fields, and rights-of-way. Nest sites generally have dense, small plant cover and some

shrub cover at the ground level, with some kind of woody form around the nest. Most nests are within 10 yards of a forest edge, such as a logging road or firebreak. Research indicates that hens nest in pine stands, including unthinned, mature loblolly stands and young (2- to 4-year-old) loblolly pine plantations. They usually don't use plantations younger than 2 years nor older than 4 years.

In large blocks of carefully managed pine plantations, hens nest in 15- to 20-year-old stands that are thinned and burned. Nesting success was much greater in mature pine forests (60 percent) than in the preferred young plantations (less than 20 percent). You can maintain the vegetative conditions necessary for nesting by late-winter burning at intervals of 3 years. You can also mow or bush-hog, but you should not burn, mow, or bush-hog during the spring-early summer nesting season (March-July).

### *Broods (Summer)*

Young turkeys eat mostly insects the first couple of weeks after hatching and then quickly begin to pick up fruits and seeds. For poult protection, vegetation dense enough to afford some cover from predators is necessary. Forest edges next to fields and openings can provide this cover and are excellent brood habitat during this vulnerable time. You can plan forest harvesting to provide a good mix of mature to young forest.

In central Mississippi, broods prefer mature bottomland hardwood forests, where there are sparse shrubs and understory and moderate ground cover of grass-

es, sedges, forbs, and vines. Broods used burned pine plantations older than 10 years but avoided plantations burned less frequently than every 2 years. Plantations 15 to 20 years old that have been thinned and burned often provide good brood habitat. Overall, you can use many different types of forested habitats for hens with broods, as long as adequately dense herbaceous vegetation (for insect production) with some brushy cover nearby is available. Ideally, brood habitat should be mixed with nesting habitat so broods won't have to move far. Thinning and burning pine plantations improve brood habitat conditions. Patchy burns, with burned areas next to unburned areas, provide the best habitat.

### **Range Shifts**

In the fall, turkeys begin to shift their ranges as food sources change to items such as dogwood fruits and oak acorns. Many times forests will provide better winter range for turkeys than other vegetative types, as mast foods, such as acorns, become available. Turkeys may move from pine plantations into mixed pine-hardwood or hardwood stands now, but well-managed (thinned and burned) pine stands may still see heavy use in winter (pine seed is good turkey food). In years when hard mast crops are light, turkeys may heavily use these and other forest types and fields.

In the spring, as winter flocks break up, the birds use a variety of forested habitats, but turkeys tend to move toward areas with more openings (such as pastures). They use openings a lot in the spring breeding season to display and mate. The openings also provide greens and insects for food.

### **Other Habitat Needs**

#### **Roosts**

Turkeys roost in a variety of forested habitats but often prefer to roost in conifers next to water. On upland

forested sites, turkeys frequently roost on slopes near ridgetops or knolls. Many times these roost sites offer protection from bad weather. Turkeys roost in pine plantations, mixed pine-hardwood stands, and bottomland hardwoods. They often use flooded riverfront hardwood forests and bald cypress trees as roost sites in the Delta.

#### **Roads**

Roads can be helpful or harmful to turkeys, depending on management and protection. In large spreads of pine plantation forest, turkey use is related to spur roads. Roads that are daylighted (opened up) will provide more natural green vegetation for insect and seed production, or they can be planted in cover crops to prevent erosion and provide the same benefits of natural vegetation for turkeys. Roads that are closed with locked gates are important for protecting wild turkeys.

#### **Water**

The relationship between turkey populations and being able to get water is not certain, but turkeys can move long distances to get free water or can get water from vegetation, fruits, and insects they eat. Free water may be important during drought.

### **Forest Management**

Forest Service projections show a slow decline in forest acreage across the Southeast over the next several decades. The area currently in pine plantations is projected to double in this period. Natural pine forests are projected to decline by about half, and mixed stands are projected to decline by about 22 percent. Some agricultural land is being reforested under programs such as the Conservation Reserve Program.

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## **Tips for Improving Wild Turkey Habitat**

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#### **General**

- Create forest stands up to 100 acres in size.
- Distribute stand ages.
- Maintain SMZ's of hardwoods.
- Establish long rotations in hardwoods (60 to 90+ years).
- Thin timber frequently during rotation.

#### **Prescribed Burning**

- Burn frequently (3 to 5 years) to encourage herbaceous growth.
- Limit burns to winter months.

#### **Regeneration**

- Keep mixed stands when possible.
- Regenerate pine types by clearcut or seed tree methods.
- Encourage up to 50 percent of hardwood types as hard mast species.
- Do not change bottomland hardwoods to conifers.
- Keep roost trees and cypress ponds.

#### **Direct Habitat Improvements**

- Provide openings planted with clover.
- Eliminate fall tillage of crops and leave some grain unharvested.
- Avoid nesting and brooding areas from March through June.



### *Pine Plantations*

As pine plantation acreage increases in Mississippi, more intensive management will be required to maintain diverse turkey habitats. Rotation length should be 40 to 60 years, if it's economical. Harvest cut areas should be kept as small as possible (10 to 100 acres), with age class dispersion of unharvested, adjacent stands of at least 5 to 7 years. Shapes of clearcuts should provide edges for turkeys to nest along - but not so they will encourage predators to build their nests.

Stream-side management zones (SMZs) should be marked before harvest and treated as separate, unburned, manageable stands from harvested pine plantations. If possible, keep at least 15 percent of the pine plantation area in SMZs. They can be particularly important to turkeys for travel areas, roosting sites, and for mast and other food source production not normally found in plantations. Protecting islands of mast-producing trees in clearcut areas can provide more food sources. You should do prescribed burning in stands as early as possible and, preferably, do patchy winter burns on a 3- to 5-year rotation after plantations are 10 years old. Burning improves taste and nutrition of understory plants, stimulates some types of fruit production, and maintains open understories. You should do commercial thinning at least twice during the rotation of a stand, and, if affordable, protect volunteer hardwoods that provide food within plantations.

### *Mixed Upland Pine-Hardwood Forests*

You should keep mixed stands as natural stands where feasible. In harvesting operations, maintain a good mix of hardwoods and pines of mast/fruit-producing age. You can do thinning, seed tree or shelterwood regeneration cuts, and burning to promote mast production and maintain needed herbs and shrubs in the understory. Protect mid-story species such as flowering dogwood and other fruit producers.

### *Bottomland Hardwood Forests*

Bottomland stands can produce lots of hard mast in one year. Maintain bottomland hardwoods in a vigorous state to take advantage of the potential during these good mast-production years. Rotation lengths of 60 to 90+ years should provide adequate age distribution of healthy mast-producing trees. Frequent, selective improvement harvests, thinnings, and group select cuts provide needed timber harvest while maintaining turkey habitats. Keep fire out of bottomland stands. Keep roost trees that are next to water sources as well as SMZs along bayous, sloughs, and minor and major creeks and rivers.

In general, all timber management operations should include erosion control and site restoration work, where you replant disturbed areas with species such as clover, bahia grass, wheat, or others that may provide feeding, nesting, or brood-rearing cover.

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## **Wild Turkey Foods by Habitat Type**

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<b>Habitat</b>	<b>Foods</b>		
<b>Openings</b>	<b>Grass/Seeds</b>	<b>Forage</b>	<b>Insects</b>
	Paspalums	Clovers	Grasshoppers
	Panicums	Grasses	Millipedes
	Legumes	Sedges	Insect Larvae
<b>Moist Bottomland</b>	Snails	Insects	Worms
<b>Pine Plantations</b>	Grasses, legumes, seeds	Herbaceous green forage	Insects, soft mast, pine seed
<b>Mixed Pine/Hardwood Stands</b>	<b>Soft Mast</b>		<b>Seeds</b>
	Dogwood	Grapes	Longleaf Pine
	Blackberries	Dewberries	Sweetgum
	Huckleberries	Blackhaw	Magnolia
	Blackgum Spice Bush	Cherries	
<b>Mature Hardwood</b>		<b>Hard Mast</b>	
	Acorns	Beechnuts	Pecans

---

Revised by **Dr. Ben West**, Assistant Extension Professor, Department of Wildlife and Fisheries.

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# Waterfowl



## WOOD DUCKS IN MISSISSIPPI

Wood ducks are one of three migratory waterfowl that nest regularly in Mississippi. Unlike most other ducks, they build nests in hollow trees. They often perch in trees, and they are one of the most beautiful and colorful birds in North America. Along with the mallard, wood ducks are some of the most abundant ducks in Mississippi, and they make up a large percentage of waterfowl bagged in Mississippi each year. They also are excellent table fare.

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### Description and Identification

The male “woodie” is easily recognized by his white throat and chin strap and his bright green and purple feathers. The female, like most female ducks, is brownish; she has a white throat patch and a prominent, white eye-ring. Male and female wood ducks have well-defined head crests and long, dark, square tails that are marks of identification in flight. Woodies increase from 1 ounce to 1 pound in 6 weeks and generally weigh about 1½ pounds when mature.

They are known as “the bird of the shadows” because of the heavy cover they require. Their large eyes allow them to see better than most other birds.

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### Habitat

Wood ducks require several types of habitat including nesting, rearing, and feeding. They normally nest in natural cavities, usually within one-half mile of a suitable water area. The closer the nest is to water the better, but the nest may be as far as 4 to 5 miles from where the female normally feeds and rests.

Suitable nest cavities, at a minimum, must provide room for the hen to incubate her eggs easily. The cavity entrance can vary from 5 to 70 feet above the ground.

Good brood-rearing habitat may consist of water, heavy vegetation, and low-hanging bushes. This combination produces an abundance of insects and vegetable matter to feed the ducklings. It also provides protective cover for young ducklings.

Feeding areas vary from flooded bottomland hardwoods with acorns and other hard-mast production to marshy areas that provide native aquatic and semi-aquatic vegetation and seed production.

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### Life History

Although wood ducks prefer nesting in cavities near an isolated lake or stream in wooded areas, they will readily nest in man-made boxes. These artificial nesting boxes and protection from over-harvest are main factors contributing to population increases.

The female wood duck does not build a nest but nests atop decayed wood in the bottom of the cavity. She lays one egg each day, usually in the early morning. When she leaves her nest, she covers the eggs with the loose material in the bottom of the nest. Later in the egg-laying cycle, she adds down plucked from her breast to the nest each day until she has finished laying.

Generally, she lays 5 to 19 small, round, dull-white eggs. The average number is 15; however, as many as 70 eggs, several layers deep, have been found in the nests of wood ducks. The large number of eggs occurs when more than one female lays in the same nest. This is called a “dump”

nest and is the result of having more breeding birds than nesting cavities. The eggs hatch in 27 to 30 days; some 24 hours after hatching, the female calls to her young from the ground. The downy young ducks use their sharp claws and hooked nail at the tip of the bill to climb out of the nest, and then they jump to the ground or water. The nestlings are so light they literally float to the surface without being injured. The female gathers her brood together and leads them to the nearest water. They remain with her until they can fly, which is about 8 weeks later.

In Mississippi nesting starts in February and continues until it peaks in April or May. Much of the late nesting is caused by re-nesting females whose nests are destroyed by predators.

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### **Molt**

The male wood duck leaves the female before the eggs hatch and joins other males in secluded areas. Wood ducks lose their flight feathers (cannot fly) and are quiet and inactive during the molt so as not to attract predators.

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### **Food**

The main diet of young ducks is insects. Adult wood ducks are primarily vegetarians, although they eat some insects. Foods for adult woodies include dogwood, acorns, button bush, coontail, duckweed, lotus, pondweed, swamp privet, water lily, and wild rice. Animal foods include a diversity of aquatic invertebrates.

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### **Predators**

Raccoons, snakes, and opossums eat wood duck eggs. Starling and woodpeckers puncture the eggs, and squirrels crack them. Raccoons and bobcats are probably the worst enemies because they often trap and kill the female wood duck on the nest. If the female is not killed, she will re-nest in another location. If a nest is not molested, the same bird will come back and use the cavity year after year. Snakes, mink, raccoons, turtles, owls, hawks, herons, and fish (for example, bass, gar) prey on young ducks. Inclement weather also takes its toll.

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### **Management**

When duck food is scarce, plant brown-top and Japanese millet on exposed mud flats, beaver ponds, sloughs, or farm ponds and fields. Flood the area to attract wood ducks and other waterfowl species.

One of the best ways to boost the number of wood ducks is to provide adequate nesting sites protected from predators. Build nesting boxes properly shielded against predators, as described in the drawings. It is critical to the protection of the nest box that you construct predator shields as shown; install nest boxes properly in selected locations. Place boxes in or near water at a level at least 5 feet above the water line; avoid locations where flooding could cover boxes. Ongoing research may ultimately reveal the most suitable sites for nest box placement.

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Revised and distributed in Mississippi by Dean Stewart, Extension Wildlife Specialist  
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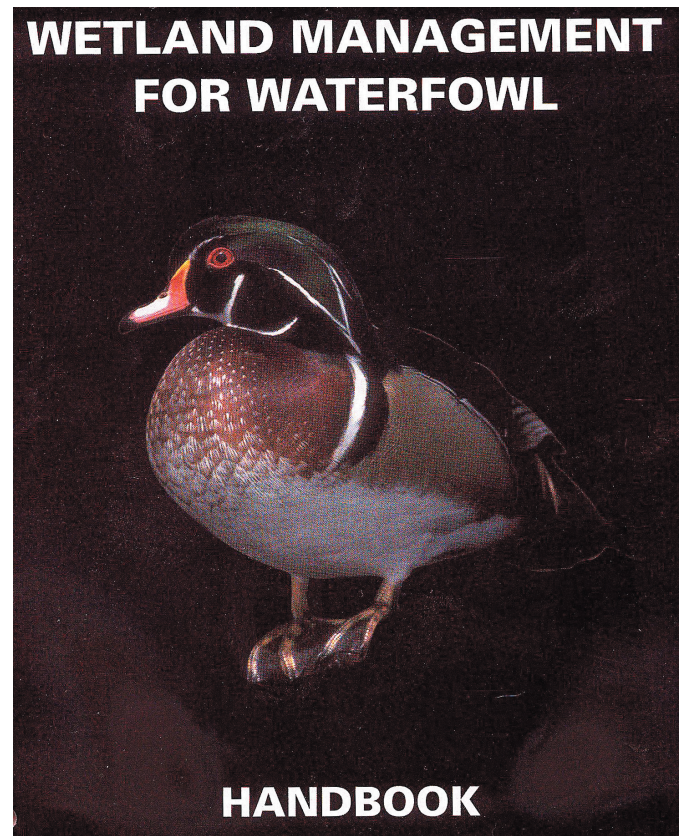
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# Wetland Management for Waterfowl Handbook

This handbook, produced by the Natural Resources Conservation Service, Mississippi Fish and Wildlife Foundation, U.S. Fish and Wildlife Service, Ducks Unlimited, and Delta Wildlife, contains detailed information on wetland management. Topics include: wetland types common to the Lower Mississippi Alluvial Valley, Waterbird migration season overview, Wetland management strategies for food and habitat, other waterfowl foods, life history and wetland management for wood ducks, wetland plan identification guide, and a moist-soil data sheet.

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## **13.4.6. Strategies for Water Level Manipulations in Moist-soil Systems**



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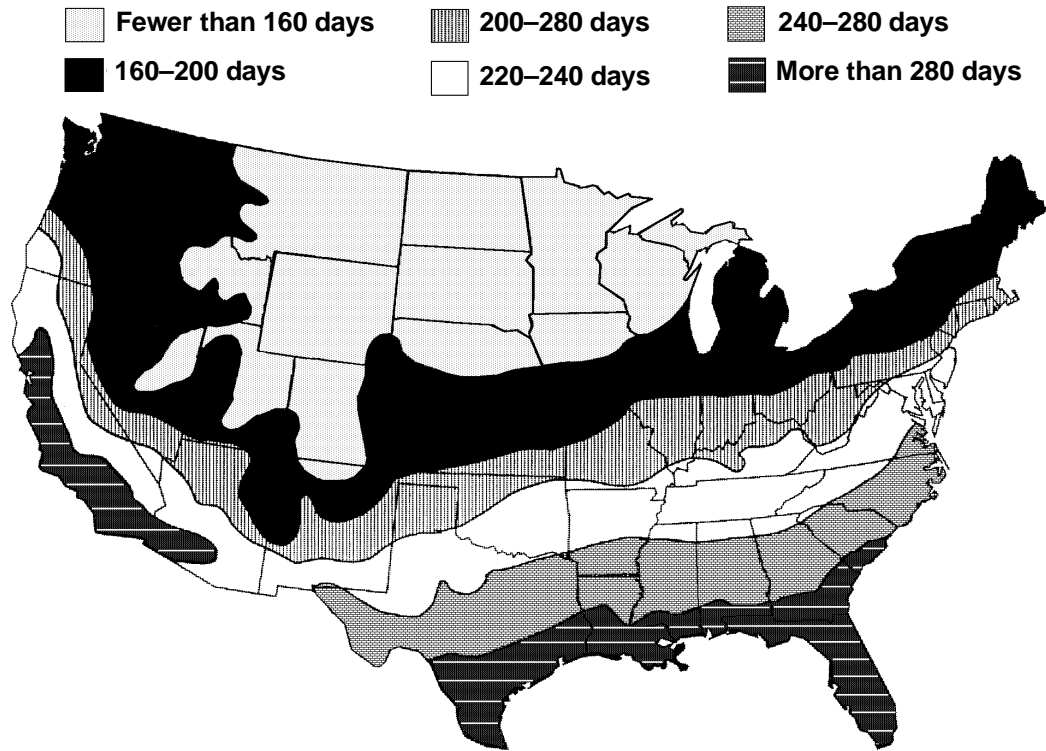
Water level manipulations are one of the most effective tools in wetland management, provided fluctuations are well-timed and controlled. Manipulations are most effective on sites with (1) a dependable water supply, (2) an elevation gradient that permits complete water coverage at desired depths over a majority of the site, and (3) the proper type of water control structures that enable water to be supplied, distributed, and discharged effectively at desired rates. The size and location of structures are important, but timing, speed, and duration of drawdowns and flooding also have important effects on plant composition, plant production, and avian use. When optimum conditions are not present, effective moist-soil management is still possible, but limitations must be recognized. Such situations present special problems and require particularly astute and timely water level manipulations. For example, sometimes complete drainage is not possible, yet water is usually available for fall flooding. In such situations, management can capitalize on evapotranspiration during most growing seasons to promote the germination of valuable moist-soil plants.

### **Timing of Drawdowns**

Drawdowns often are described in general terms such as early, midseason, or late. Obviously, calendar dates for a drawdown classed as early differ with both latitude and altitude. Thus the terms early, midseason, and late should be considered within the context of the length of the local growing season. Information on frost-free days or the average length of the growing season usually is available from agricultural extension specialists. Horticulturists often use maps depicting different zones of growing conditions (Fig. 1). Although not specifically developed for wetland management, these maps provide general guidelines for estimating an average growing season at a particular site.

In portions of the United States that have a growing season longer than 160 days, drawdowns normally are described as early, midseason, or late. In contrast, when the growing season is shorter than 140 days, drawdown dates are better described as either early or late. Early drawdowns are those that occur during the first 45 days of the growing season, whereas late drawdowns occur in the latter 90 days of the growing season. For example, the growing season extends from mid-April to late October (200 days) in southeastern Missouri. In this area, early drawdowns occur until 15 May, midseason drawdowns occur between 15 May and 1 July, and late drawdowns occur after 1 July (Table 1). The





**Fig. 1.** Zones depicting general differences in the length of the growing season.

correct terminology for drawdown date can be determined for each area using these rules of thumb.

*Moist-soil Vegetation*

The timing of a drawdown has an important influence on the composition and production of moist-soil plants. Although the importance of specific factors resulting in these differences has not been well studied for moist-soil vegetation, factors such as seed banks, soil types, soil temperatures, soil moisture levels, soil-water salinities, day length, and residual herbicides undoubtedly influence the composition of developing vegetation.

Water manipulations will be effective and economical only if the site has been properly designed and developed (Table 2). Levees, type and dependability of water source (e.g., ground water,

river, reservoir), type and placement of water control structures, water supply and drainage systems, and landform are among the most important elements that must be considered. Independent control and timing of water supply, distribution, depth, and discharge within and among units are essential (Table 2).

An independent water supply for each unit is required to optimize food production, maintain the potential to control problem vegetation, and make food resources available for wildlife (Table 2). Optimum management also requires that each unit have the capability of independent discharge. Stoplog water control structures that permit water level manipulations as small as 2 inches provide a level of fine tuning that facilitates control of problem vegetation or enhancement of desirable vegetation.

**Table 1.** *Environmental conditions associated with time of drawdown in southeastern Missouri.*

	Date	Temperature	Rainfall	Evapotranspiration
Early	1 April–15 May	Moderate	High	Low
Mid	15 May–1 July	Moderate–High	Moderate	Moderate
Late	1 July or later	High	Low	High

Table 2. *Important considerations in evaluating wetland management potential.*

Factors	Optimum condition
Water supply	Independent supply into each unit Water supply enters at highest elevation
Water discharge	Independent discharge from each unit Discharge at lowest elevation for complete drainage Floor of control structure set at correct elevation for complete drainage
Water control	Stoplog structure allowing 2-inch changes in water levels Adequate capacity to handle storm events
Optimum unit size	5 to 100 acres
Optimum number of units	At least 5 within a 10-mile radius of units

Wetland systems with high salinities can easily accumulate soil salts that affect plant vigor and species composition. Wetland unit configurations that allow flushing of salts by flowing sheet water across the gradient of a unit are essential in such areas. A fully functional discharge system is a necessity in arid environments to move water with high levels of dissolved salts away from intensively managed basins. Thus, successful management in arid environments requires units with an independent water supply and independent discharge as well as precise water-level control.

### *Scheduling Drawdowns*

During most years, early and midseason drawdowns result in the greatest quantity of seeds produced (Table 3). However, there are exceptions, and in some cases, late drawdowns are very successful in stimulating seed production.

Table 3. *Response of common moist-soil plants to drawdown date.*

Family	Common name	Species Scientific name	Drawdown date		
			Early <sup>a</sup>	Midseason <sup>b</sup>	Late <sup>c</sup>
Grass	Swamp timothy	<i>Heleocholea schoenoides</i>	+ <sup>d</sup>	+++	+
	Rice cutgrass	<i>Leersia oryzoides</i>	+++	+	
	Sprangletop	<i>Leptochloa</i> sp.		+	+++
	Crabgrass	<i>Digitaria</i> sp.		+++	+++
	Panic grass	<i>Panicum</i> sp.		+++	++
	Wild millet	<i>Echinochloa crusgalli</i> var. <i>frumentacea</i>	+++	+	+
	Wild millet	<i>Echinochloa walteri</i>	+	+++	++
	Wild millet	<i>Echinochloa muricata</i>	+	+++	+
Sedge	Red-rooted sedge	<i>Cyperus erythrorhizos</i>		++	
	Chufa	<i>Cyperus esculentus</i>	+++	+	
	Spikerush	<i>Eleocharis</i> spp.	+++	+	+
Buckwheat	Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	+++		
	Curlytop ladysthumb	<i>Polygonum lapathifolium</i>	+++		
	Dock	<i>Rumex</i> spp.		+++	+
Pea	Sweetclover	<i>Melilotus</i> sp.	+++		
	Sesbania	<i>Sesbania exalta</i>	+	++	
Composite	Cocklebur	<i>Xanthium strumarium</i>	++	+++	++
	Beggarticks	<i>Bidens</i> spp.	+	+++	+++
	Aster	<i>Aster</i> spp.	+++	++	+
Loosestrife	Purple loosestrife	<i>Lythrum salicaria</i>	++	++	+
	Toothcup	<i>Ammania coccinea</i>	+	++	++
Morning glory	Morning glory	<i>Ipomoea</i> spp.	++	++	
Goosefoot	Fat hen	<i>Atriplex</i> spp.	+++	++	

<sup>a</sup> Drawdown completed within the first 45 days of the growing season.

<sup>b</sup> Drawdown after first 45 days of growing season and before 1 July.

<sup>c</sup> Drawdown after 1 July.

<sup>d</sup> + = fair response; ++ = moderate response; +++ = excellent response.

In areas characterized by summer droughts, early drawdowns often result in good germination and newly established plants have time to establish adequate root systems before dry summer weather predominates. As a result, early drawdowns minimize plant mortality during the dry period. Growth is often slowed or halted during summer, but when typical late growing-season rains occur, plants often respond with renewed growth and good seed production. In contrast, midseason drawdowns conducted under similar environmental conditions often result in good germination, but poor root establishment. The ultimate result is high plant mortality or permanent stunting. If the capability for irrigation exists, the potential for good seed production following midseason or late drawdowns is enhanced.

Germination of each species or group of species is dependent on certain environmental conditions including soil temperature and moisture. These conditions change constantly and determine the timing and density of germination (Table 3). Smartweeds tend to respond best to early drawdowns, whereas sprangletop response is best following late drawdowns. Some species are capable of germination under a rather wide range of environmental conditions; thus, control of their establishment can be difficult. Classification of an entire genera into a certain germination response category often is misleading and inappropriate. For

example, variation exists among members of the millet group (*Echinochloa* spp.). *Echinochloa frumentacea* germinates early, whereas *E. muricata* germinates late because of differences in soil temperature requirements. Such variation among members of the same genus indicates the need to identify plants to the species level.

Natural systems have flooding regimes that differ among seasons and years. Repetitive manipulations scheduled for specific calendar dates year after year often are associated with declining productivity. Management assuring good production over many years requires variability in drawdown and flooding dates among years. See *Fish and Wildlife Leaflet 13.2.1* for an example of how drawdown dates might be varied among years.

### Wildlife Use

Drawdowns serve as an important tool to attract a diversity of foraging birds to sites with abundant food resources. Drawdowns increase food availability by concentrating foods in smaller areas and at water depths within the foraging range of target wildlife. A general pattern commonly associated with drawdowns is an initial use by species adapted to exploiting resources in deeper water. As dewatering continues, these "deep water" species are gradually replaced by those that are adapted to exploit foods in

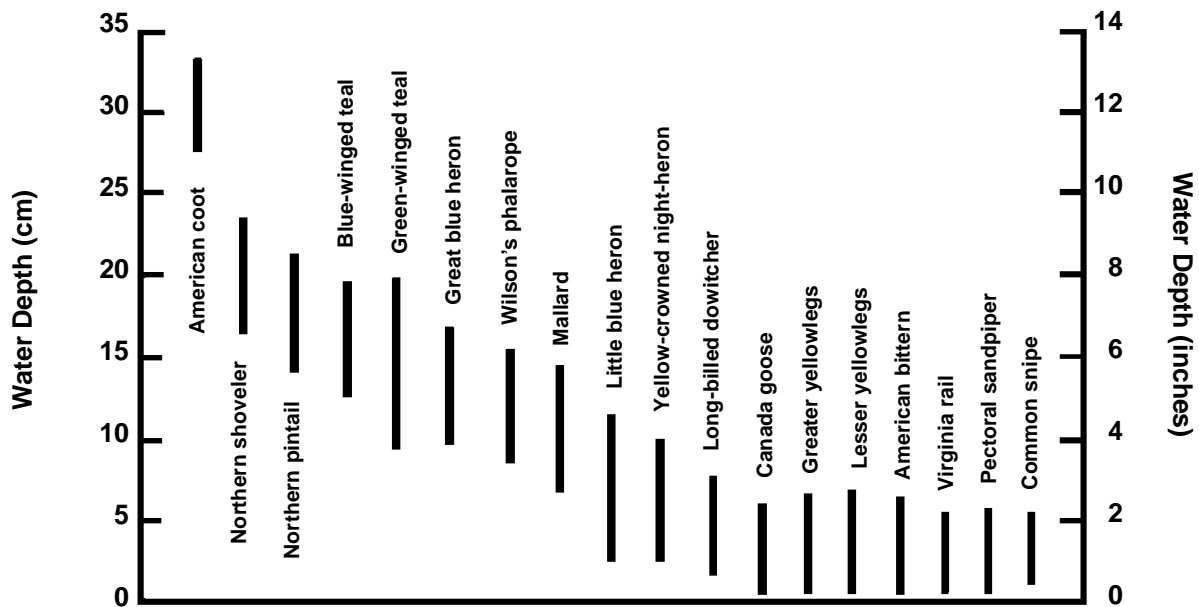


Fig. 2. Preferred water depths for wetland birds commonly associated with moist-soil habitats.

shallower water (Fig. 2). The most effective use of invertebrate foods by wetland birds occurs when drawdowns to promote plant growth are scheduled to match key periods of migratory movement in spring. By varying drawdown dates among units, the productivity of each unit can be maintained and resources can be provided for longer periods. Slow drawdowns also prolong use by a greater number and diversity of wetland wildlife.

## Effects of Drawdown Rate

### Moist-soil Plant Production

#### Fast Drawdowns

Sometimes fast drawdowns (1–3 days) are warranted, especially in systems with brackish or saline waters where the slow removal of water may increase the level of soil salts. However, in most locations fast drawdowns should only be scheduled early in the season or when flood irrigation is possible. Rapid drawdowns that coincide with conditions of high temperature and little rainfall during the growing season create soil moisture conditions that often result in poor moist-soil responses (Table 4). Some germination may occur, but generally development of root systems is inadequate to assure that these newly established plants survive during summer drought. Thus, at latitudes south of St. Louis, fast drawdowns are never recommended after 15 June if irrigation is not possible.

#### Slow Drawdowns

Slow drawdowns (2–3 weeks) usually are more desirable for plant establishment and wildlife use. The prolonged period of soil saturation associated with slow drawdowns creates conditions favorable for moist-soil plant germination and establishment (Table 4). For example, slow drawdowns late in the growing season can result in seed yields of 700 pounds per acre. Rapid drawdowns on adjacent units subject to identical weather conditions have resulted in 50 pounds per acre. Furthermore, slow drawdowns provide shallow water over a longer period, ensuring optimum foraging conditions for wildlife. If salinities tend to be high, slow drawdowns should only be scheduled during winter or early in the season when ambient temperatures and evapotranspiration are low.

Table 4. Comparison of plant, invertebrate, bird, and abiotic responses to rate and date of drawdown among wet and dry years.

	Drawdown rate	
	Fast <sup>a</sup>	Slow <sup>b</sup>
<b>Plants</b>		
Germination		
Period of ideal conditions	short	long
Root development		
Wet year	good	excellent
Dry year	poor	excellent
Seed production		
Early season	good	excellent
Mid-late season	not recommended	excellent
Wet year	good	good
Drought year	poor	good
Cocklebur production	great potential	reduced potential
<b>Invertebrates</b>		
Availability		
Early season	good	excellent
Mid-late season	poor	good
Period of availability	short	long
<b>Bird use</b>		
Early season	good	excellent
Mid-late season	poor	good
<b>Nutrient export</b>	high	low
<b>Reducing soil salinities</b>	good	poor

<sup>a</sup> Less than 4 days.

<sup>b</sup> Greater than 2 weeks.

### Invertebrate Availability in Relation to Drawdowns

When water is discharged slowly from a unit, invertebrates are trapped and become readily available to foraging birds along the soil–water interface or in shallow water zones (Table 4). These invertebrates provide the critical protein-rich food resources required by pre-breeding and breeding female ducks, newly hatched waterfowl, molting ducks, and shorebirds. Shallow water for foraging is required by the vast majority of species; e.g., only 5 of 54 species that commonly use moist-soil impoundments in Missouri can forage effectively in water greater than 10 inches. Slow drawdowns lengthen the period for optimum foraging and put a large portion of the invertebrates within the foraging ranges of many species. See *Fish and Wildlife Leaflet 13.3.3* for a description of common invertebrates in wetlands.

## Spring Habitat Use by Birds

Slow drawdowns are always recommended to enhance the duration and diversity of bird use (Table 4). Creating a situation in which the optimum foraging depths are available for the longest period provides for the efficient use of food resources, particularly invertebrate resources supplying proteinaceous foods. Partial drawdowns well in advance of the growing season (late winter) tend to benefit early migrating waterfowl, especially mallards and pintails. Early-spring to mid-spring drawdowns provide resources for late

migrants such as shovelers, teals, rails, and bitterns. Mid- and late-season drawdowns provide food for breeding waders and waterfowl broods. These later drawdowns should be timed to coincide with the peak hatch of water birds and should continue during the early growth of nestlings or early brood development.

## Fall Flooding Strategies

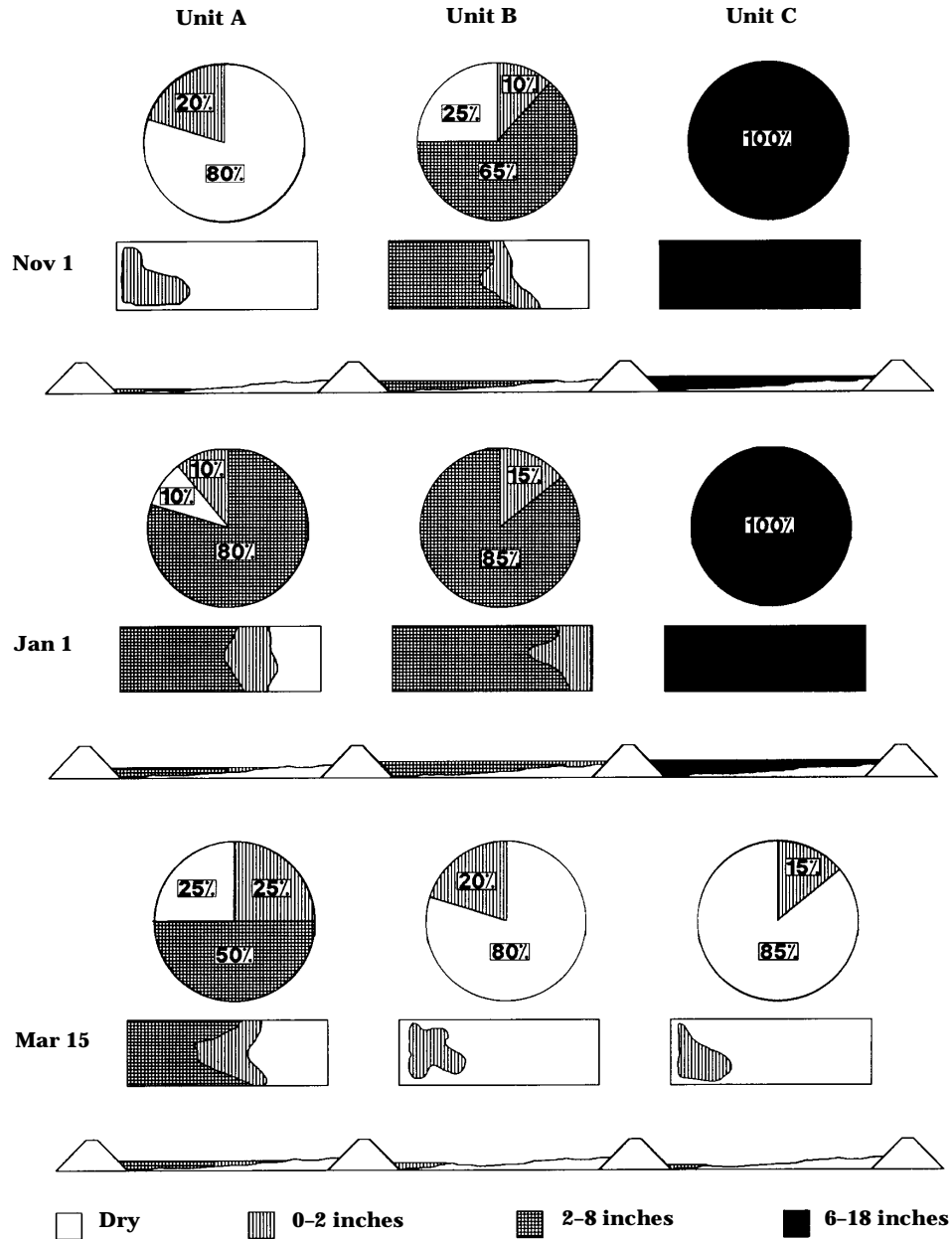
Scheduling fall flooding should coincide with the arrival times and population size of fall migrants (Table 5). Sites with a severe disease history should not be flooded until temperatures

Table 5. Water level scenario for target species on three moist-soil impoundments and associated waterbird response.

Period	Unit A		Unit B		Unit C	
	Scenario	Water level Response	Scenario	Water level Response	Scenario	Water level Response
<b>Early fall</b>	Dry	None	Dry	None	Gradual flooding starting 15 days before the peak of early fall migrants; water depth never over 4 inches	Good use immediately; high use by teal, pintails, and rails within 2 weeks
<b>Mid fall</b>	Dry	None	Flood in weekly 1–2-inch increments over a 4-week period	Excellent use by pintails, gadwalls, and wigeons	Continued flooding through September	Excellent use by rails and waterfowl
<b>Late fall</b>	Flood in weekly 2–4-inch increments over a 4–6-week period	Excellent use immediately by mallards and Canada geese	Continued flooding, but not to full functional capacity	Excellent use by mallards and Canada geese	Continued flooding to full functional capacity	Good use by mallards and Canada geese
<b>Winter</b>	Maintain flooding below full functional capacity	Good use by mallards and Canada geese when water is ice free	Maintain flooding below full functional capacity	Good use by mallards and Canada geese when water is ice free	Continued flooding to full pool	Good use by mallards and Canada geese when water is ice free
<b>Late winter</b>	Schedule slow drawdown to match northward movement of migrant waterfowl	Excellent use by mallards, pintails, wigeons, and Canada geese	Schedule slow drawdown to match northward movement of early migrating waterfowl	Excellent use by mallards, pintails, wigeons, and Canada geese	Schedule slow drawdown to match northward movement of waterfowl	Good use by mallards and Canada geese when water is ice free
<b>Early spring</b>	Continued slow drawdown to be completed by 1 May	Excellent use by teals, shovelers, shorebirds, and herons	Drawdown completed by 15 April	Excellent shorebird use	Drawdown completed by 15 April	Excellent shorebird use

moderate. When flooding is possible from sources other than rainfall, fall flooding should commence with shallow inundation on impoundments suited for blue-winged teals and pintails. Impoundments with mature but smaller seeds, such as panic grass and crabgrasses, that can be flooded inexpensively are ideal for these early migrating species. Flooding always should be gradual and

should maximize the area with water depths no greater than 4 inches (Fig. 3). As fall progresses, additional units should be flooded to accommodate increasing waterfowl populations or other bird groups such as rails. A reasonable rule of thumb is to have 85% of the surface area of a management complex flooded to an optimum foraging depth at the peak of fall waterfowl migration.



**Fig. 3.** Planned flooding strategies for three moist-soil units during one winter season. The initiation, depth, and duration of flooding are different for each unit. Note that two of the three units were never intentionally flooded to capacity. This does not mean that natural events would not flood the unit to capacity. Flooding strategies should be varied among years to enhance productivity.

## Suggested Reading

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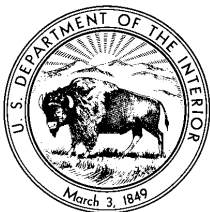
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## Appendix. Common and Scientific Names of Birds Named in Text.

Pied-billed grebe . . . . .	<i>Podilymbus podiceps</i>
American bittern . . . . .	<i>Botaurus lentiginosus</i>
Great blue heron . . . . .	<i>Ardea herodias</i>
Little blue heron . . . . .	<i>Egretta caerulea</i>
Yellow-crowned night-heron . . . . .	<i>Nycticorax violaceus</i>
Tundra swan . . . . .	<i>Cygnus columbianus</i>
Snow goose . . . . .	<i>Chen caerulescens</i>
Canada goose . . . . .	<i>Branta canadensis</i>
Mallard . . . . .	<i>Anas platyrhynchos</i>
Northern pintail . . . . .	<i>Anas acuta</i>
Northern shoveler . . . . .	<i>Anas clypeata</i>
Blue-winged teal . . . . .	<i>Anas discors</i>
Canvasback . . . . .	<i>Aythya valisineria</i>
Virginia rail . . . . .	<i>Rallus limicola</i>
American coot . . . . .	<i>Fulica americana</i>
Greater yellowlegs . . . . .	<i>Tringa melanoleuca</i>
Lesser yellowlegs . . . . .	<i>Tringa flavipes</i>
Pectoral sandpiper . . . . .	<i>Calidris melanotos</i>
Long-billed dowitcher . . . . .	<i>Limnodromus scolopaceus</i>
Wilson's phalarope . . . . .	<i>Phalaropus tricolor</i>
Common snipe . . . . .	<i>Capella gallinago</i>



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 FISH AND WILDLIFE SERVICE  
*Fish and Wildlife Leaflet 13*  
 Washington, D.C. • 1991





# Build a duck nest box

Wood ducks, Barrow's goldeneyes, common goldeneyes, hooded mergansers, common mergansers and buffleheads are all cavity nesting ducks. They build nests in abandoned woodpecker holes or natural tree cavities caused by disease, fire or lightning. These ducks will also use a constructed nesting box. Here are plans for a nest box that you can build, install and maintain. The design, which is used by the Ducks Unlimited Greenwing program, may even attract other cavity nesting birds such as kestrels, tree swallows, great crested flycatchers or screech owls.

## Cedar is ideal\*

Cedar lumber is recommended because it is naturally resistant to weather and insects. You can also use any materials you have available such as pine or plywood. The box pictured uses 10.5 linear feet of 1" X 10" (3/4" thick by 9 1/4" wide) lumber that is rough on one side (for the inside of the box). \*Ducks Unlimited staff in the interior of British Columbia indicate that plywood boxes better withstand the region's temperature extremes.

## Finishing touches

Ducks Unlimited does not recommend applying a finish to cedar boxes. A finish might help to extend the life of a plywood box.

If you decide to apply a finish to your nest box, use a nontoxic wood preserver or a light shade of an earth tone paint. The ducks will find your box by seeing the contrast in color caused by the entry hole. Do not apply finish inside the box.

Cavity nesting ducks do not carry nesting materials. It's important to help them out by placing four to six inches of wood shavings in the bottom of the box. You can find wood shavings at your local pet or farm supply store. **Do not use sawdust.** It can suffocate ducklings.

Every year, in the fall after the nesting season has completed or in the winter, clean out old nesting material from the box and replace it with a fresh layer of wood shavings. **This annual cleaning needs to be a part of your long-term maintenance commitment once you place your nest box.**



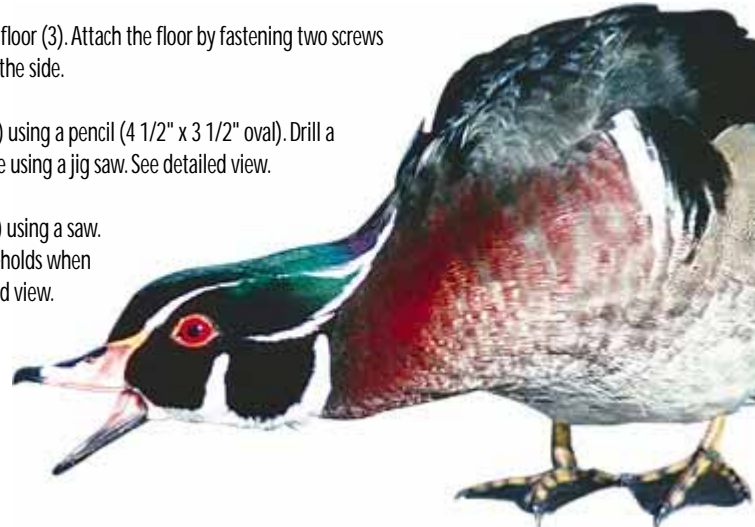
Constructing and placing a nest box is a fun project that brings years of enjoyment. Above: this pole mounted nest box features a conical metal predator guard. Below: wood duck drake.

## PROCEDURE

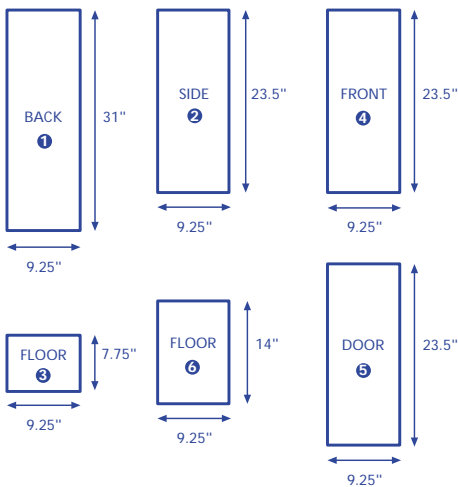
Tools needed: handsaw or table saw, drill and 1/2" bit, jigsaw, screwdriver, sandpaper, pencil, measuring tape, straight-edge

- 1) Measure and cut your wood to produce the six pieces. Number the pieces as shown. See material measurements.
- 2) Attach the back (1) to the side (2) using four screws fastened from the back of the box. See exploded view (next page).
- 3) Drill five 1/2" drainage holes in the floor (3). Attach the floor by fastening two screws through the back and two through the side.
- 4) Draw the entry hole on the front (4) using a pencil (4 1/2" x 3 1/2" oval). Drill a pilot hole and cut out the entry hole using a jig saw. See detailed view.
- 5) Score the inside face of the front (4) using a saw. The horizontal slots will provide toeholds when the ducklings climb out. See detailed view.

*continued...*



## MATERIAL MEASUREMENTS - not to scale





# Finding the right place

Now that you've completed construction of your nest box, you need to consider where to install it. Be sure to place the box in a location that will be convenient for monitoring and annual maintenance.

## Where to find tenants

To increase the chances of your nest box being used by waterfowl, it should be located in an area attractive to cavity nesting ducks. You'll see these birds using wooded wetlands that contain water year round or, at least, throughout the summer. You'll also see them using trees along riverbanks and lake shorelines.

## Positioning your nest box

Nest boxes can be mounted on tree trunks or on steel poles beside the water or above the water.

**Good placement** a dead tree at the water's edge

**Better placement** a solid dead tree in the water

**Best placement** boxes on poles near standing, flooded, dead trees

Live trees can be used for mounting boxes, but keep a close eye on your box. Growing trees may loosen mounts and make boxes less attractive to the birds.

### Tree Trunks

Live and dead trees are suitable. If beavers are about, don't place nest boxes on poplar or white birch trees. Beavers eat these trees.

### Steel Poles

Make sure the poles are fixed solidly in the soil, or marsh bottom, to ensure that the nest boxes are stable. Drill two holes in this pole to accommodate a predator guard (see below).

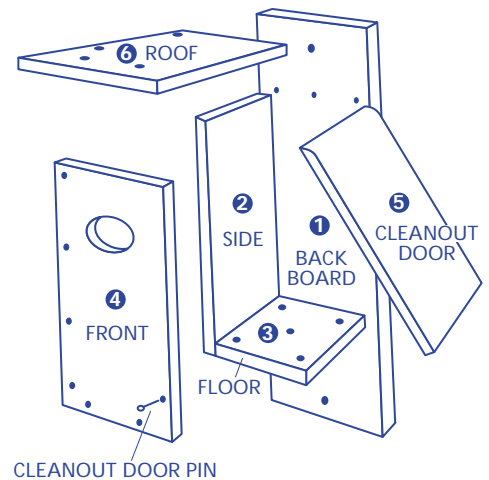
- Boxes should be placed above typical high water levels and at a height that will allow you to access the box for monitoring and maintenance (about 4 to 6 feet above land or water). In terms of distance inland, try to keep your box close to the water.
- Clear an unobstructed flight path to your nest box by removing branches that might be in the way.
- The entrance hole to the box should face the water.
- You can tip the box forward a little bit to help the ducklings reach the entrance.



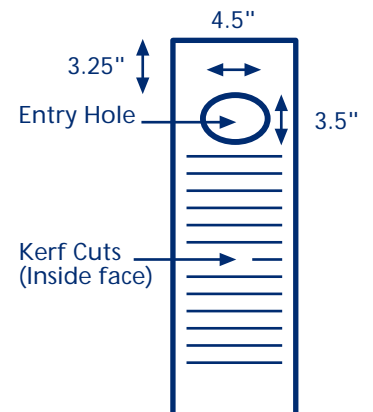
## PROCEDURE (continued)

- 6) Attach the front (4) using six screws.
- 7) Round the top, outside edge of the door (5). See exploded view. Fasten the door at the top with one screw from the front and one from the back. The two screws form the hinge and allow the door to open. Pin the door shut with a nail from the front.
- 8) Attach the roof (6) using four screws from the top and three screws from the back (be careful not to screw into the door). The box is now ready to install. Don't forget to put a 4-6 inch layer of wood shavings in the box for nesting material.

## EXPLODED VIEW - not to scale



## DETAILED FRONT VIEW not to scale



## Predator Guards

A predator guard will help to improve the chance of a successful hatch by preventing egg-eating raccoons from entering your nest box.

### 1) Steel Sheet Sandwich

36" X 49" sheet of 28 gauge steel

- Fold the sheet in half along the 49" length, creating a front and a back, each 24" wide
- Along one 36" side, make a 1" fold towards the inside centre
- Drill two holes, 34" apart (see diagram)
- Place your guard so it surrounds the pole or tree trunk. Slip the unfolded side under the 1" fold. Using vice-grips, bend the corners in to lock these pieces and prevent the guard from opening.
  - *Pole mount:* bolt the guard into place about 2" below the nest box.
  - *Tree mount:* nail the guard in place — if the tree is alive, check the guard often to ensure tree growth hasn't popped the guard off.

### 2) Plastic Pipe Guard

Metal or plastic pipe (stove pipe, sewer pipe) drilled at the top and bottom and bolted to the tree or pole makes an effective predator guard. To prevent small rodents from crawling through, place a crumpled piece of chicken wire between the pole and the guard.

### 3) Plastic "Crazy Carpet" Guard

A new use for children's inexpensive plastic snow riders located in any toy store. Wrap the carpet around the tree and tack it in place. Be sure to provide room to grow if you place this guard on a living tree.

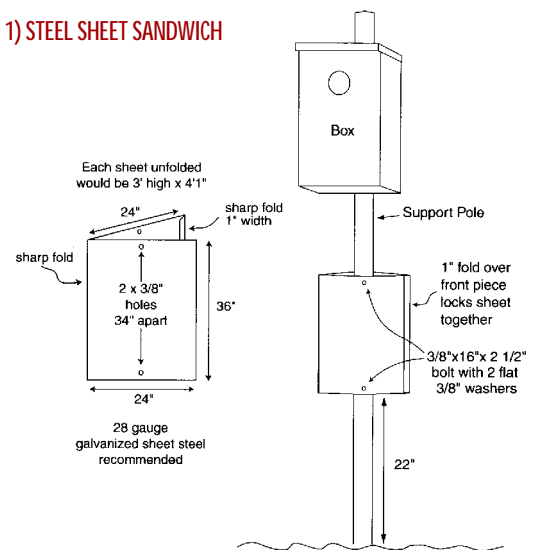
## Nest box maintenance — a long-term commitment

Once a cavity nesting bird starts using your box, you'll likely see many broods raised over the years. Nesting sites for these birds are limited in number. When they find a good nesting site, there is a very good chance they'll return in following years. When you put up a nest box you are committing yourself to maintaining that box. Fall and winter are the best times to remove old nesting material, tighten any loose screws and mounts, and add new wood shavings.

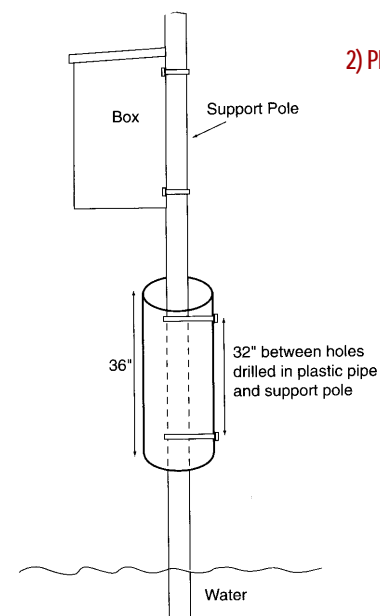
If you don't have any ducks using your box over the summer, don't worry. Waterfowl biologists have seen waterfowl migrating in the fall scope out potential nesting sites for next spring. This too is a good reason to keep your boxes in top condition. You never know when somebody might be popping in!

This information has been compiled from the *Nest Box Guide for Waterfowl* by Ducks Unlimited and the Canadian Wildlife Service, Environment Canada; and a *Conservator* article (Vol. 19, No. 3) by Mearl Rooney.

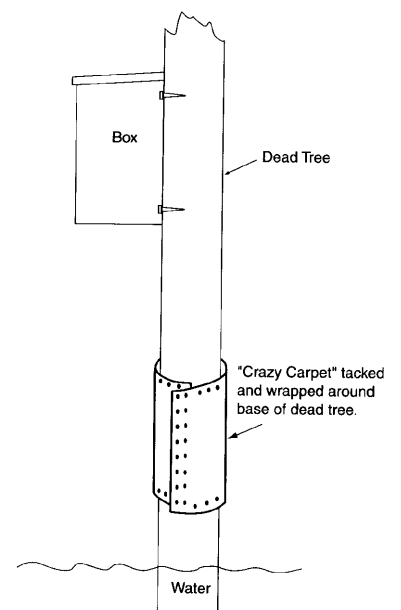
### 1) STEEL SHEET SANDWICH



### 2) PLASTIC PIPE GUARD



### 3) CRAZY CARPET GUARD



# Wetlands

# Understanding Wetlands And Endangered Species: Definitions And Relationships

Imagine you are walking through the woods. Up ahead, you see a small opening surrounded by trees, shrubs, wildflowers, and grasses. The opening has standing water with small clumps of leafy vegetation scattered throughout and isolated trees standing in the water. Around this opening the ground is soggy and dark. You see a snake move silently by while a salamander watches you before darting away.

You find a stump and sit to rest. As you settle back, you begin to notice many birds flying from one tree to the next, their calls ringing in the air. You hear tree frogs and the buzz of mosquitoes at your ear. You notice crawfish mounds near the water and droppings from a raccoon and a fox. You see the footprints of several deer, and you can see minnows in the shallow water. Water lilies float on the water surface. Butterflies visit the swamp lilies and dragonflies dart through the air.

What is this place and why are there so many different plants and animals here? This place is a wetland. Wetlands provide food, cover, and nesting sites (habitat) for many different animals—many of which are becoming increasingly rare.

We all know that the whys and hows of wetlands and endangered species protection are among the more controversial and actively debated natural resource issues of our day. Many people, even those who have a great love for wildlife, have been taught that wetlands are “wastelands” which serve no purpose unless they are drained and “put to use.” My purpose here is to explain, in general terms, what wetlands and endangered species are and to discuss the relationships which often exist between the two. This explanation will emphasize the role wetlands play in providing habitat for many plants and animals and the consequences loss of wetland habitat has had on many species.



## What Are Wetlands?

While the warm, fuzzy description given at the beginning of this publication helps develop a mental picture of a wetland, it leaves out the mosquito bites and humidity for which these areas are famous. In fact, wetlands have had a bad reputation, especially with early settlers who thought that “swamp vapors” caused fevers. This bad reputation and the realization that wetlands, when drained, often converted to very productive and valuable farm land were the root causes of wetland acreage losses which began in earnest in the mid-1800s.

Wetlands share some of the characteristics of both uplands and open water. Because wetlands are often located in an intermediate position between uplands and open water, many people call them transitional areas. Despite the early belief that wetlands were more valuable if converted to another use, time has proven that wetlands serve many functions which make them valuable in their natural state. Some of the valuable functions performed by wetlands are: protection of water quality, flood prevention, water storage, and wildlife habitat.

A few common types of wetlands include: fringe wetlands located along the shoreline of lakes; salt and freshwater marshes located in coastal areas; deepwater swamps and bottomland hardwood forests along rivers; and prairie potholes located in Canada and the upper midwestern states.

## Three Components Of A Wetland

To be considered a jurisdictional or legal wetland, all three of the following components must be present: wetland hydrology; hydric soils; and hydrophytic vegetation.

The hydrology (the presence, abundance, and source of water) determines and maintains the structure and function of a wetland. The hydrology of a wetland also drives the formation of hydric soils.

Hydric soils are soils that are “saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part.” Anaerobic conditions develop when water displaces oxygen present within the pore spaces of a soil. Hydric soils are often gray in color and may smell like rotten

eggs. Orange-colored deposits often occur around roots growing within hydric soils. Such things as how often and how long the soils are saturated or flooded; the depth of flooding; the time of year during which the soils are saturated or flooded, and whether the water is fresh or saline determine the type of vegetation found in a wetland.

Hydrophytic vegetation literally means “water-loving” vegetation. Plants that are able to grow and reproduce in wetlands do so because of special adaptations which allow them to survive in a waterlogged environment. Many wetland plants have very spongy roots. These roots have air spaces, which are believed to allow the movement of oxygen from the leaves to the roots, thereby allowing the plant to thrive despite the anaerobic conditions present in the soil. Wetland plants may have adventitious roots (roots growing out of the trunk above the soil surface), surface roots (roots growing at or just above the soil surface), or lenticels (openings on roots and stems for oxygen exchange). The type and abundance of vegetation is an important factor in determining what types of animal species use the wetland.

## Wetland Productivity

Many wetlands have very high primary productivity rates. This means that the plants growing in the wetland are very efficient at converting sunlight, water, and soil nutrients into plant tissue. Typically, the most productive wetlands are coastal wetlands and wetlands located adjacent to rivers or streams. The reason that many of these areas are so productive is related to the hydrology or movement of water which occurs within many wetlands.

Coastal wetlands flood regularly due to tidal water movement. Tidal flooding flushes the soils of coastal wetlands, removing toxins and wastes which may make the soils inhospitable to plants or burrowing animals. In addition, the regular movement of water into and out of coastal wetlands helps to re-aerate soils. This re-aeration results in more vigorous growth of wetland plants.

Wetlands adjacent to rivers flood on a fairly regular basis. This movement of water delivers nutrients, sediment, and organic matter from upland areas, creating the rich soils for which these systems are so valued.

## Which Animals Inhabit Wetlands?

Not surprisingly, the fact that many wetlands are highly productive means that they are also rich in animal species. Animals are attracted to wetlands because they provide food, water, cover, and nesting sites. In short, wetlands provide many animals with homes. Many species live their entire lives in wetlands and are completely dependent on them for survival. Other species are dependent on wetlands only during a portion of their life cycle. For these species wetlands serve either as a summer home, a winter home, or an occasional feeding or resting spot.

Wetlands provide critical habitat for wildlife, and, in fact, wetlands exceed all other land types in wildlife productivity. It has been estimated that in the United States roughly 150 species of birds and more than 200 species of fish depend on wetlands for their survival.

Many birds such as the great blue heron, great egret, bald eagle, osprey, red-shouldered hawk, owls, wild turkey, belted kingfisher, red-bellied woodpecker, pileated woodpecker, and several species of swallows, sparrows, and warblers use wetlands. Ducks occupy wetlands in great numbers. Duck species include the wood duck, mallards, black ducks, blue-winged teal, gadwall, widgeon, and the northern pintail.

Mammals such as the muskrat, beaver, raccoon, and white-tailed deer also use wetlands. In addition, a wide variety of reptiles, turtles, and freshwater fish depend on wetlands for survival.

One group of animals often overlooked when the inhabitants of wetlands are considered is the invertebrate species. These small animals, which include flatworms, aquatic earthworms, leeches, crawfish, and fairy shrimp, are vital links between plants and the animal food chains. Many invertebrates graze on living plants while others consume dead organic material. The invertebrates are in turn eaten by fish, birds, frogs, toads, and turtles. So, in fact, invertebrates make energy available to animals which may consume little or no plant material.

While much remains to be learned about the many different species of invertebrates that inhabit wetlands of various types, research has shown that these species have very specific habitat requirements. What happens to these vital links when wetlands are altered or destroyed? What happens to the animals that depend on these species for some or all of their nutritional requirements? Obviously, if the flow of energy, in the form of food, from one species to another is interrupted, there will be a negative impact on both species diversity and on population size.

## What Are Endangered And Threatened Species?

The Earth is rich in both animal and plant species. However, a number of species are experiencing trouble meeting their needs. Some of these species are considered “endangered” while others are considered “threatened.” Endangered species are species that, if not protected, are in imminent danger of permanently disappearing from Earth. Threatened species are species that, if not protected, are likely to become endangered in the foreseeable future. In 1973, Congress passed the Endangered Species Act with the express purpose of protecting species that were in danger of extinction.

There are many reasons why a species may face extinction, including such natural events as long-term changes in climate and worldwide sea level fluctuations. Some species are found only in small numbers in few locations which means that any change (whether natural or induced) could negatively impact them. Today, people have the ability to alter land, water, air, and climate to a degree never before seen. As a consequence, the majority of species facing extinction today do so as a result of habitat degradation or destruction caused by people. Worldwide, roughly 1,100 species have been designated as either threatened or endangered. In addition, another 3,600 have been identified as candidates for threatened or endangered status although official action has not been taken.

## Why Is Wetland Habitat Threatened?

Wetland habitat degradation can result from either increased or decreased flow of water into or out of an area; decreased water quality, resulting from excess nutrients and toxic chemicals originating from faulty septic tanks; overflowing sewers; or runoff from agricultural lands or urban areas. Wetland habitat destruction results from the transformation from natural areas to agricultural fields, urban development, or plant monocultures.

Another danger facing wetland-dependent species is the fragmenting of wetlands into smaller and smaller unconnected areas. When this happens, species requiring large areas of land to survive will begin to disappear. This has been observed with the black bear in Louisiana and the Florida panther in Florida. Other animals, which might not need large ranges, may still face the problem of inbreeding or isolation from suitable reproductive partners simply because they can no longer move from one nearby wetland site to another.

Wetlands have been particularly hard-hit with both habitat degradation and destruction. In fact, roughly half of all wetlands that existed within the lower 48 states at the time of European settlement have disappeared. Some states, such as California have lost as much as 90 percent of the wetlands present 200 years ago. Alabama has lost approximately 50 percent of its original wetlands, Mississippi and Tennessee have lost roughly 59 percent, and North Carolina has lost 44 percent. Kentucky has lost 80 percent of the wetlands that were present 200 years ago. Historically, most of this loss was to agriculture. Present-day wetland loss is often associated with urban expansion, particularly in coastal areas. Conversion of bottomland hardwood forests to pine does still occur in parts of the Southeast.

## How Does Wetland Loss Affect Wetland-Dependent Species?

Not surprisingly, coupled with the dramatic destruction of wetlands and degradation of remaining wetlands, there has been a marked decrease in the populations of many animal and plant species that depend on these systems for survival. At least 95 plant, 5 mammal, 22 bird, 4 reptile, 3 amphibian, and 22 fish species listed as endangered or threatened depend on wetland habitats for survival. In 1986, there were 188 species of animals listed as threatened or endangered by the federal government. Of these, roughly 50 percent were wetland related. The animal groups with the largest numbers listed as threatened or endangered are the fish, mussels, and

**Federally Listed Endangered And Threatened Species Associated With Wetlands.\***

	Number Of Endangered Species Associated With Wetlands	Number Of Threatened Species Associated With Wetlands	Percent Of Total Species Listed In United States
Plants	17	12	28
Animals			
Mammals	7	—	20
Birds	16	1	68
Fishes	26	6	48
Reptiles	6	1	63
Amphibians	5	1	75
Insects	1	4	38
Mussels	20	—	66
Total	98	25	

Source: Niering 1988.

\*Only species listed within the United States are included here.

birds. In 1986, 103 plants were listed as threatened or endangered, and 28 percent were considered wetland dependent.

As of 1991, the U.S. Fish and Wildlife Service had listed 595 plant and animal species as threatened or endangered. Of this number, 256 (43 percent) are wetland dependent. In fact, wetlands provide fully 60 percent of all threatened species and 40 percent of all endangered species listed in 1991 with essential habitat. The table illustrates the breakdown of threatened and endangered species by taxonomic groups.

Information on many wetland-dependent plant and animal species is limited. However, data on waterfowl, which migrate from northern to southern wetlands every year, have been collected for many years. Although these species are not threatened or endangered, they have experienced significant decline in numbers. It was estimated that there were 145 million ducks migrating from Alaska, Canada, and the northern prairie states in the period just after World War II. By 1992, that number had dropped to 64 million—a 56 percent reduction. This decrease was attributed primarily to loss of habitat. Many people feel that the decrease observed in duck populations is an indication that many other wetland species are also experiencing declines.

Migratory species, such as waterfowl, may require different types of wetlands at different times during the year. In 1982 it was estimated that 80 percent of the American breeding bird population and more than 50 percent of the 800 species of protected migratory birds relied on wetlands. This means that impacts on wetlands in one part of the United States, Canada, Mexico, or South America may adversely impact the numbers and species composition of migratory birds. This fact complicates attempts to protect wetland-dependent species because decisions affecting migratory birds must be made not only across state boundaries, but across countries and in some cases continents.

## Conclusion

As you can see, wetlands are valuable real estate to many plants and animals. The next time you discuss the issues of wetlands and endangered species I hope the information provided here will help you have a better understanding of how these two issues are related. Hopefully I've helped you to a better understanding of the value of wetlands and how many animal and plant species depend on them for survival. Unless we all begin to understand this relationship, you can expect to hear more and more about endangered species at the same time that you hear about wetland loss.

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**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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# White-tailed Deer



# White-Tailed Deer Management

White-tailed deer are found in all 67 Alabama counties. In fact, huntable populations of deer thrive close to all major metropolitan areas of the state. Deer hunting pumps millions of dollars into Alabama's economy each year, and recreational demand for deer hunting is growing rapidly.

Increasing numbers of landowners in Alabama are realizing the potential income from leasing their land to deer hunters. Others have capitalized on this demand by opening commercial hunting operations.

Considering their present abundance and the accounts of early explorers to Alabama, it's hard to imagine that deer were once nearly eliminated from the state. Fewer than 10,000 deer, restricted largely to isolated river bottoms of southwestern counties, existed in Alabama during the early 1900s.

Protection, favorable land-use changes, and restocking deer in suitable habitat allowed populations to respond dramatically. Alabama's herd now numbers in excess of 1 million deer.

## Physical Characteristics

The long necks of white-tailed deer and the antlers of mature males give the appearance of an animal of considerable size, but deer seldom stand taller than 40 inches at the shoulder. In fact, most measure less than 36 inches tall.

Size and weight vary according to sex, age, nutrition, and genetic composition. Adult bucks may weigh from 65 to more than 200 pounds. Does generally weigh about two-thirds as much as bucks.

Deer have a keen sense of smell. They rely upon smell to detect danger, identify other animals, and locate food. Deer have large, cupped ears that can rotate, giving them an acute sense of hearing. Their eyesight, though not as well developed as other senses, readily detects movement over a wide field of vision.

Deer, like cows, have compound, four-chambered stomachs that allow digestion of plant materials. Initially, food enters the first chamber or *rumen*. From there, it may be regurgitated and chewed further as

cud. The other three chambers are the *reticulum*, the *omasum*, and the *abomasum*, respectively.

Muscles and skeletal structure of deer are well adapted to running. Deer are capable of exceeding 30 miles per hour for short intervals. Weight is carried on the toes, and some bones of the feet are fused to extend their gait. Bones of the shoulders and front feet are encased entirely in muscle, adding greater flexibility to limb movement.

## Life History

Alabama white-tailed deer fawns are usually born during July, August, and September. However, in some scattered populations, fawns are dropped during May and June. At birth, white-tailed deer weigh only 4 to 6 pounds.

Fawns are born with a reddish-brown coat covered with white spots that allow them to blend naturally with patterns of sunlight and shade. This coat is gradually replaced by brownish-gray winter hair. Weaning usually occurs by 4 months of age, but fawns may remain with their mothers for more than a year.



In Alabama, bucks and does breed during winter, usually from late December through February. Bucks and does normally breed for the first time in their second winter. Much of the breeding by males is performed by older, socially dominant bucks. Consequently younger males, though sexually mature, play a minor role in breeding.

Occasionally, on very good range, does conceive during their first winter and give birth when 1 year old. Does bearing young for the first time usually give birth to only one fawn. Thereafter, does typically have two fawns each year if the food is adequate.

Young bucks start growing antlers during their first spring when they are about 9 to 12 months old. The paired antlers are bony outgrowths from the skull. Growing antlers are supplied with blood vessels and are covered by hairy skin called velvet.

Antler growth is usually complete by late September. The velvet then dries and is sloughed or rubbed off. These hard, polished antlers are kept throughout the breeding season and shed during late winter. Growth of new antlers begins almost immediately.

### Habitat Needs

The white-tailed deer is one of the more adaptable large mammal species in the world. Given adequate protection, deer thrive over a wide array of land-use types and, often, close to humans.

Deer habitats are composed of different quantities and qualities of food, cover, and water. The number of deer that can be supported in good physical condition on any given land area is called the carrying capacity of that habitat.

**Food.** Deer require an abundance and variety of nutritious foods for growth, reproduction, and maintenance. The amount and nutritional content of available food will affect deer productivity, health, size, and antler growth. On the average, a deer eats 4 to 6 or more pounds of food daily for each 100 pounds of body weight. During a year, one deer may eat more than a ton of food.

Deer have been known to feed on thousands of different food items. Generally, food is selected according to its availability, nutritional value, and taste. The preferred food of deer may vary from area to area and may change seasonally. Table 1 lists some of the foods deer eat. Besides foods listed in this table, legumes are also extremely good deer foods.

During spring through early fall, deer eat succulent grasses, legumes, weeds, fleshy fruits, assorted agricultural crops, and the tender growth of shrubs, trees, and vines. During fall and winter, their diet shifts to acorns, evergreen leaves, succulent green growth of small grains, and stems of many woody plants.

**Table 1. Deer-Browse Plants In Alabama.**

Common Name	Scientific Name	Rating
Common Persimmon	Diospyros virginiana	H
Strawberry Bush	Euonymus americanus	H
Ashes	Fraxinus spp.	H
Japanese Honeysuckle	Lonicera japonica	H
Southern Crabapple	Malus angustifolia	H
oaks	Quercus spp.	H
Blackberry, Raspberry,		
Dewberry	Rubus spp.	H
Greenbrier	smilax spp.	H
Sweet Pepperbush	Clethra alnifolia	H-M
Hollies	Ilex spp.	H-M
Wild Grapes	Vitis spp.	H-M
Red Maple	Acer rubrum	M
Rattan Vine	Berchemia scandens	M
Trumpet Creeper	Campsis radicans	M
Flowering Dogwood	Comus florida	M
Swamp Cyrilla	Cyrilla racemiflora	M
Yellow Jessamine	Gelsemium sempervirens	M
Virginia Sweetspire	Itea virginia	M
Yellow Poplar	Liriodendron tulipifera	M
Waxmyrtle	Myrica cerifera	M
Blackgum	Nyssa sylvatica	M
Blackcherry	Prunus serotina	M
Sweetleaf	Symplocos tinctoria	M
American Beautyberry	Callicarpa americana	M-L
Eastern Redcedar	Juniperus virginiana	M-L
Sweetgum	Liquidambar styraciflua	M-L
Sweetbay	Magnolia virginiana	M-
Redbay	Persea borbonia	M-L
Elderberry	Sambucus canadensis	M-L
Sassafras	Sassafras albidum	M-L
Blueberry, Huckleberry	Vaccinium spp.	M-L
Boxelder	Acer negundo	L
Buttonbush	Cephalanthus occidentalis	L
Sourwood	Oxydendrum arboreum	L
Rhododendron	Rhododendron maximum	L

H=High

M = Moderate

L=Low

Food items must be from ground level to 4 1/2 feet high to be available to deer. Tender, palatable stems of vines and trees are useless, regardless of their abundance, if they are out of reach for deer.

**Cover.** Deer can inhabit a variety of sites, but the areas providing the best cover include an even mixture of mature hardwoods, croplands, brushlands, and pasturelands.

An uneven aged woodland with scattered openings is best since it produces an abundance of succulent vegetation within easy reach of browsing deer. Such an area also provides plenty of resting and bedding room.

**Water.** Although deer get some water by eating succulent foods, they require free water for drinking almost daily. Streams, ponds, and other wet areas

are used regularly for drinking. Access to water does not limit deer abundance in Alabama. But, during periods of drought, water may influence the habitat they use.

### **Herd Management**

Deer herds are managed primarily by selective removal through hunting. Unlike other game animals in Alabama, deer have few natural predators to keep populations in check. Sport hunting takes the place of natural predators.

If un hunted or lightly hunted, deer increase rapidly until their numbers exceed available food supplies. As this occurs, preferred foods are eliminated, herd productivity is reduced, and the health and size of the animals begin to decline.

Continued population increases often cause long-term habitat destruction. The incidence of disease and parasites increases. Ultimately, natural mortality rises and, occasionally, widespread die-offs occur.

Once a deer population reaches the carrying capacity of the habitat, the growth must be stabilized. About 35 percent of a deer population must be removed annually to stabilize the population. Intensive buck-only hunting rarely removes more than 10 to 15 percent of a population. Removing significant numbers of antlerless deer (does) is necessary to keep a deer herd from becoming overpopulated.

### **Buck Management**

Many sport hunters are interested in increasing their opportunities for taking a trophy buck. Such objectives demand that deer populations be reduced enough to ensure that adequate nutrition is available for good body and antler growth. Hunters must also be willing to conserve younger age classes of bucks and allow them to reach potential trophy age (4 to 7 years).

It is normal for Alabama bucks to have spikes when they are yearlings. Given time and good food, almost all will develop nice racks as they get older. Do not eliminate all spikes because of the mistaken belief that spikes are a sign of genetic inferiority. Removing spikes is not recommended as a way to increase antler size.

Alabama Department of Conservation biologists can help landowners and hunting clubs define management objectives and outline harvest strategies through the Deer Management Assistance Program. If you or your club is interested in this program, write to the Alabama Department of Conservation and Natural Resources, Division of Game and Fish, 64 N. Union, Montgomery, AL 36130.

### **Habitat Management**

The capability of land to support deer is influenced largely by vegetation types and condition, soil pro-

ductivity, and weather patterns. Land may be manipulated to increase the number of deer it can sustain and to improve nutritional plants for existing populations. Ideally, a mixture of habitat types, over relatively small areas, should be provided for deer.

Several land/forest management techniques are very valuable for managing deer habitat. They include prescribed burning, timber thinning, food plantings, and fertilization programs.

### **Prescribed Burning**

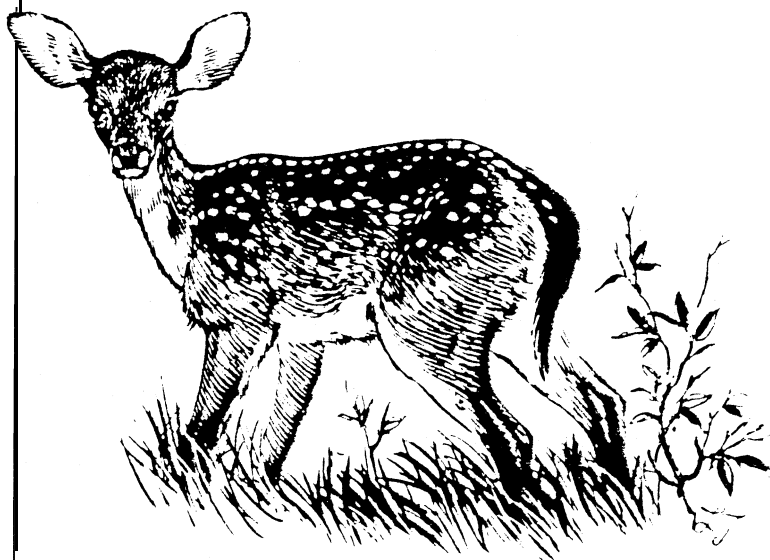
Prescribed burning is an effective method of increasing the abundance and improving the quality of deer forage in old fields and pine-dominated woodlands. Additionally, prescribed fire is an excellent timber management tool.

On most sites, deer forage is increased by burning small blocks of woodlands on a 3- to 5-year cycle. This is attained by burning about one-fifth to one-third of all suitable areas each year. Preferably areas no larger than about 200 acres should be burned in any one block. For deer, restrict fire use to February and March.

The Alabama Forestry Commission and private forestry/wildlife consultants can provide technical assistance to landowners who are inexperienced in prescribed burning. The commission also will plow fire containment lanes at a small fee for landowners.

### **Thinning/Cutting**

Extensive stands of mature timber allow very little sunlight to reach the forest floor. As a result, little plant growth is found in the 0- to 4 1/2-foot range where deer feed. Thinning or clearcutting small blocks of timber (1/2 to 10 acres in size) opens the forest canopy and allows more sunlight to reach the forest floor. Consequently, deer food abundance and availability are increased.



Logging roads and food plot margins are often good sites for cutting or thinning. The edges of these areas may be maintained in deer forage production by periodic burning or mowing (every 3 years). When thinning or cutting, try to avoid cutting down trees that are producing good deer food. Good, natural deer foods are listed in Table 1.

Manage forest stands to maximize different types of food for deer. Manage large stands of timber on an uneven-age basis so that trees of all sizes and ages occur throughout the stand. Small, even-aged stands provide good habitat if they are mixed in among other stands of different ages.

### **Food Plantings**

Food plots are frequently planted to supplement native foods and to attract deer for hunting. Small grains and clovers are planted as a winter grazing source for deer. Seeds of corn, grain sorghum, beans, and peas are energy-rich foods that are suitable for food plots and are planted during the spring and summer.

Food plots should be from 1 to 5 acres in size to help ensure adequate food production and availability. Larger plots may be needed for summer plantings of beans or peas in areas where deer populations are high.

Soil test; then lime and fertilize according to recommendations. The correct lime and fertilizer is absolutely necessary for optimum production, nutrient quality, and use of food plantings by deer. Table 2 gives recommendations for several fall green

field plantings. County agents can help with suitable plant varieties, planting dates, and methods.

### **Fertilizing**

Fertilizing woodlands and patches of native vegetation is an effective but underused method of attracting deer. Nutritional content and production of Japanese honeysuckle may be increased by light, periodic applications of complete fertilizer during spring and summer. Deer are attracted to these natural food plots by the improved nutrition and taste of fertilized plants.

Acorn yields of oaks may be increased by applying regular fertilizer from spring through summer. Apply a complete fertilizer under the drip-line of selected trees, beginning at flowering (usually during early April) and every 6 weeks thereafter through September.

**Table 2. "Green Field" Crop Planting Recommendations.**

<b>Crop</b>	<b>Seeding Rate Per Acre</b>
Clover, Crimson	20-30 pounds broadcast
Clover, White	2-4 pounds broadcast
Wheat	90-120 pounds drilled or broadcast
Ryegrass, Winter Mixture:	40 pounds broadcast
Clover, Crimson	15 pounds broadcast
Clover, White	2 pounds broadcast
Ryegrass	10-15 pounds broadcast
Wheat	60-90 pounds broadcast



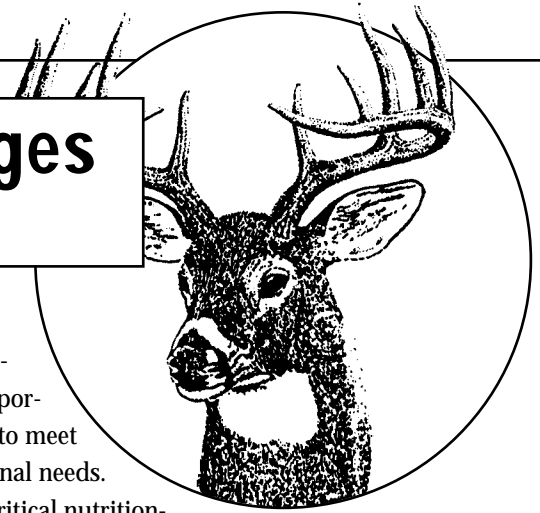
ANR-521

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**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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# Planting Warm-Season Forages for White-Tailed Deer



The white-tailed deer is the most popular big game animal in the country. It is also one of the most plentiful, with more than 30 million in the U.S. Annual harvests in North America increased from 2 million deer in 1978 to more than 5.3 million in 1994. Certain regions (including the Southeast) are facing overpopulation problems.

Overpopulation damages forest regeneration and agricultural crops and increases deer-vehicle collisions and disease. Annual U. S. damage may be as high as \$1 billion or more.

Overpopulation creates unhealthy deer herds because of inadequate food supplies and can reduce health and abundance of native plant communities. Plant communities, which provide staple deer browse foods like vines, forbs, woody plant leaves, and twigs, decline over time from overbrowsing.

Deer herd health, including fawn production, body weight, and antler development, depends on good nutrition, age, and genetics. Nutritional requirements, including adequate protein and mineral levels, must be met through adequate habitat management. Habitat management involves proper manipulation of commercial forestland and agricultural crops. Management of native vegetative species, from forbs (weeds) to mature trees, impacts habitat quality more than any food planting or supplemental effort.

As an example, timber clearcuts, if planned, harvested, and reforested properly, can provide diverse habitat edges, excellent escape cover, and large quantities of nutrient-rich forage/foods as they grow back into young forests. Small, irregularly-shaped harvest cuts with streamside management zones (strips of timber left along drains) provide excellent habitat if these areas are part of a mix of habitat types. Depending on initial tree spacing and site quality, areas that are replanted to pine trees may provide good forage production for 3 to 7 years, and even longer for hardwood regeneration areas. Forage production eventually declines as the amount of sunlight reaching the forest floor declines. Later in the forest cycle, with proper fertilization, pruning, thinning, and other timber stand treatments, these areas can again provide excellent habitat.

While native vegetation management has a much greater potential to increase total deer forage production than food

plantings, plantings may be important seasonally to meet specific nutritional needs.

The two most critical nutritional times annually for white-tailed deer are late summer, when deer population levels are high and native food quality is low, and late winter, when forage quality and quantity is low and mast (fruit) from oaks and other trees is scarce.

Research has indicated that if at least 1 percent of an area is planted to year-round cool- and warm-season forages, the plots can positively affect the nutritional plane and quality of whitetails. Cool-season forages can aid hunter harvest and improve deer condition, but the benefits of warm-season forage management are often overlooked. Planting summer forages may be as important as planting cool-season forages, since antler growth, fawn production, and initial rearing take place then. Therefore, both bucks and does face special nutritional demands. Seasonal comparisons indicate deer eat the most food in late summer. We know that deer use of warm-season plantings declines from highest in March to lowest in early June. Use increases in late June, peaks in August, then declines slowly through September.

Warm-season food plot planning requires careful thought and on-the-ground evaluation. Existing openings like pipeline and transmission line rights-of-way, abandoned secondary roads, and firelines can provide economical locations for food plots. Carefully plan and consider equipment needs and access points, soil quality, fertilization or liming requirements, size and distribution of plots, seedbed preparation, and choice of planting materials. Landowners should approve planting locations. Designate enough planting sites  $\frac{1}{2}$  to 3 acres in size to plant 1 to 2 percent of the managed area. Make plots long and narrow, but do not exclude sunlight from plots in forested areas. Evenly distribute warm- and cool-season plantings by dividing plots and planting half to each type, or at least distribute both food types evenly across the area.

The abundance and condition of wildlife are related directly to soil fertility. Soil fertility may vary widely on a given area, with higher fertility generally being found near

drainages and in low areas. These are locations which, if available for planting, will produce the best warm-season forage plots, since they are both fertile and generally hold moisture better during the summer months. Initially, conduct a soil test for each new food plot location. Your Extension Service office can provide soil test kits and soil analysis. Soil test results will be tailored to give the fertilization and lime requirements for each planting material specified for use. Proper fertilization will dramatically increase forage produce and is critical to deer use. Liming, if recommended, will bring the pH up and dramatically increase the efficiency of fertilizer and forage production. To be effective at the time of seed germination, lime generally requires application 3 months before seed planting. Legume seeds must be treated with the proper inoculant at the time of planting and will produce their own nitrogen.

Plant and manage forage with a farm tractor and 5-foot wide implements including a disk, broadcast seeder/fertilizer distributor, and mower. A harrow, 2-row planter, and a hand and/or electric seeder are also useful. Plots should be limed, disked, and allowed to settle before planting. Broadcast seeding increases seeding rate over similar drilled crops. Most seeds should be lightly covered with a harrow or by dragging a heavy timber, log chain, or piece of chain-link fence over the plot. Frost planting, or overseeding crops such as red or arrowleaf clover, birdsfoot trefoil, or winter hardy forage oats over closely mowed or grazed vegetation in late winter can be effective and inexpensive. Frozen ground allows seeds to contact and germinate in mineral soil.

Choices for warm-season deer plantings are limited compared to the many cool-season favorites. However, several meet criteria of spring-summer production, resistance to overbrowsing, high protein levels, and digestibility to deer. The best choices for the Southeast include Alyceclover, cowpeas, jointvetch, Lab Lab, and soybeans. Alyceclover is a legume that produces forage through the early fall. It produces abundant forage and withstands browsing pressure better than most of the other choices. Plant it with cowpeas, another favorite warm-season annual legume, to help prevent overbrowsing of the peas. Cowpea varieties such as Catjang, Iron-clay, Tory, and Wilcox have a wide soil tolerance and grow well with a pH as low as 5.5.

Large plots tend to withstand deer pressure best. The same is true of soybeans, a favorite annual legume for deer plots. Soybeans may be 40 percent protein, and deer readily use both the green leaves and beans. Unfortunately, small plots and high deer densities may leave a field of "stems" after deer find them, and thus they are useful for only a lit-

tle while. Corn, another favorite, is planted as a general crop for deer, doves, turkeys, and other animals. While not accurate to call it a summer forage, the grain matures in around 90 days, making it available mid-to-late summer. It is more important as a food resource during fall and winter, and while low in protein, it provides a good source of carbohydrates and energy. Thus, it is an important food to develop energy reserves in the fall deer herd.

Plant peas with corn at the final cultivation and fertilization to help control weeds and add much needed nitrogen. Jointvetch is a fern-like appearing plant that is adapted to moist soils. It may reseed if disked the following spring, and since it is a legume, it does not require nitrogen fertilizer. Lab Lab, a relative newcomer to the deer forage scene, is planted in the spring as are the others we have discussed. Lab Lab differs in that it is very drought tolerant and is used widely in arid climates.

Another forage to plant is Forage Brassica (rape). There are several varieties of these leafy plants. They are highly attractive to deer, average 30% or more protein, and may be available commercially in blends with Chicory and Plantain.

It can be important to document deer use of summer plots. To do this, exclosures of 3 inch wire formed into a tube 2 to 3 feet in diameter and 6 feet high can be staked to the ground on selected food plots to estimate deer use. Some forages, such as Alyce clover, hold up better to deer browsing pressure than others. Plant soybeans or peas with these types of forages to ensure adequate stands, particularly if 2 acres or smaller.

Following are recommendations for some of the common warm-season forages. Ladino clover, although it is a cool-season forage and normally planted in the fall, is included because it produces abundant forage through the summer months and, in some years, may provide a near year-round forage resource. In contrast to most cool season forages, summer forages may need herbicides to control competition.

## Alyceclover

**Description:** A warm-season legume that provides forage in the summer and early fall. Especially important to white-tailed deer as one of the few warm season forages that hold up well to browsing.

**Soil Adaptation:** Most moderate to well-drained soils, including bottomland sites.

**Fertilization:** Apply according to soil test or apply 200 lbs./acre of 1-14-14 after planting is established.

**Lime Requirements:** Apply according to soil test or

apply amounts necessary to bring pH to 6.5-7.0.

**Planting Dates:** May 1 - June 15

**Planting Rate:** Inoculate seed. Broadcast 15-20 lbs./acre or drill 16 lbs./acre

**Soil Preparation:** Disk and plant in a firm seedbed.

**Companion Plants:** Plant with forage cowpeas and/or jointvetch. Reduce seeding rate to 10 lb./acre when planting combinations.

## Ladino Clover

**Description:** A cool-season annual legume. A very popular clover for providing deer forage, and foliage and insects for quail and turkey.

**Varieties:** Osceola, Tillman, Regal, Louisiana S-1, and California

**Soil Adaptation:** Fertile, bottomland, moist soils.

**Fertilization:** Soil tests are recommended or use 300 lbs./acre of 0-20-20.

**Lime Requirements:** Apply according to soil test or use amounts necessary to maintain a soil pH of 6.5.

**Planting Dates:** September 1 - November 15.

**Planting Rate:** Requires white clover inoculant. Drill 3 lbs./acre at 1/4 inch or broadcast 4 lbs./acre and cover 1/2 inch.

**Soil Preparation:** Plant in a firm seedbed. In wet areas, broadcast and lightly disk in seed and fertilizer.

**Companion Plants:** Ryegrass, cool-season, annual small grains, and vetch. Reduce planting rate to 2-3 lbs./acre broadcast when planting combinations.

**Management:** Re-seeding can often be enhanced by fall disking or mowing and fertilizing at the rate of 40 lbs./acre of 0-20-20.

## Cowpeas

**Description:** A warm-season annual legume. Browsed by deer and rarely eaten by doves, but heavily used by turkeys and quail.

**Varieties:** Varieties are Thorsby Cream, Tory, Wilcox, Iron Clay, and Catjang.

**Soil Adaptation:** Well-drained soils, from sandy loams to heavy clay soils.

**Fertilization:** A soil test is recommended, or use amount required to maintain a soil pH of 5.5-7.0

**Planting Dates:** May 1 - July 1

**Planting Rate:** Plant 15 lbs./acre in 24-36 inch rows or broadcast 25 lbs./acre and cover 1 inch. Inoculant required.

**Soil Preparation:** Plant in a firm seedbed.

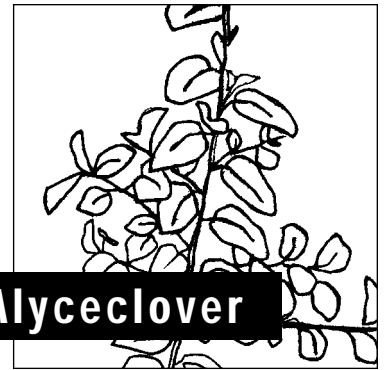
**Companion Plants:** Other warm season annual peas, Alyce Clover, and Brown Top Millet. Reduce planting rate to 12-15 lbs./acre broadcast when planting combinations.

## Soybeans

**Description:** A warm-season annual legume. Provides food and cover for rabbits, turkeys, quail, doves, and ducks. Browsed heavily by deer in early stages of growth.

**Varieties:** There are hundreds of varieties; re-seeding varieties such as Bobwhite and Quailhaven have been researched at the Natural Resources Conservation Service Plant Materials Center in Coffeerville, Mississippi. Select "forage" type varieties for best performance.

**Soil Adaptation:** Well drained, medium-textured soils such as sandy loams and



**Alyceclover**



**Ladino Clover**

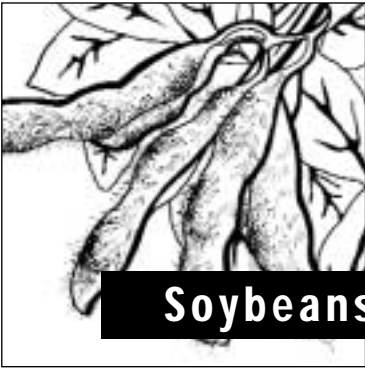


**Cowpeas**

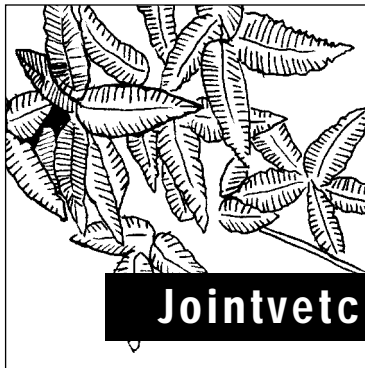
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For more information on wildlife food plantings, check out the Mississippi State University Web Site [ext.msstate.edu](http://ext.msstate.edu) and look up publications entitled "Wildlife Food Planting Guide to the Southeast" and "A Guide to Sources of Conservation and Wildlife Food-Planting Materials." Order the Food Planting guide and other wildlife-related publications from MSU-Extension Service/Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS 39762.

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**Soybeans**



**Jointvetch**

clay loams.

**Fertilization:** A soil test is recommended or use 300 lbs./acre of 0-20-20.

**Lime Requirements:** Apply according to soil test or use amounts required to maintain a soil pH of 5.8-7.0.

**Planting Dates:** May 1 - June 1

**Planting Rate:** Plant 30 lbs./acre in 24-36 inch rows or drill 30 lbs./acre at 10 inch row spacing or broadcast 50 lbs./acre and cover  $\frac{1}{2}$  inch; inoculant required.

**Soil Preparation:** Plant in a well disked, firm seedbed.

**Companion Plants:** Corn. Reduce planting rate to 30-35 lbs./acre broadcast when planting combinations.

**Management:** If planted for waterfowl, remember that non-reseeding variety seeds will spoil in 30 days after flooding. Also, waterfowl do not utilize the protein in soybeans very efficiently, even though they readily consume them. Plant large plots in areas with high deer densities, or plots will be overbrowsed quickly.

## Jointvetch (Deer Vetch)

**Description:** A warm-season annual, re-seeding legume. Provides excellent forage for deer and succulent foliage and seeds for dove, quail, and turkeys. Will grow on wet sites and can be flooded 18-24 inches for ducks.

**Soil Adaptation:** Moist and wet, light-textured soils. Do not plant in sandy soils.

**Fertilization:** A soil test is recommended or use 300 lbs./acre of 0-10-20.

**Lime Requirements:** Apply according to soil test or apply amounts necessary to keep a soil pH of 5.5-6.5.

**Planting Rate:** Broadcast 8-10 lbs./acre and cover  $\frac{1}{2}$  inch; inoculation required.

**Soil Preparation:** Plant in a well disked, firm seedbed.

**Companion Plants:** Warm-season perennial grasses.

**Management:** Re-seeding can be enhanced by spring disking; reapply 200 lbs./acre of 0-10-20. Not very competitive – may require preplanting herbicide application.



[ext.msstate.edu](http://ext.msstate.edu)

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# Wildlife Foods





*Wildlife*  
**FOOD PLANTING**  
*Guide*  
**FOR THE SOUTHEAST**

# Wildlife

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## FOOD PLANTING

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### Guide

FOR THE SOUTHEAST

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*Diverse habitat, including a mixture of different forest types and openings, is important to meeting needs of wildlife.*



*Disking strips in openings next to timber sets back natural succession, which helps meet needs for early successional species such as bobwhite quail.*



*Prescribed burning in pine forests is one of the most important cost-effective and beneficial tools forest and wildlife managers use.*

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# *Wildlife*

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## **FOOD PLANTING**

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### *Guide*

#### **FOR THE SOUTHEAST**

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Wildlife require suitable, healthy living areas to survive and increase population numbers. The living areas must provide the food, cover, space, and water needs of different animals. Together, these components create an animal's habitat. Management of native vegetative species, from forbs (weeds) to mature trees, will impact habitat quality more than any food planting or supplemental efforts. Also, for many wildlife species, especially the ones mentioned in this publication, habitat management must include proper protection and harvest.

This guide has been designed for the Southeast to help landowners, recreation clubs, and hunters better manage populations of white-tailed deer, eastern wild turkey, bobwhite quail, mourning dove, and various species of waterfowl. These same techniques also will benefit many nongame wildlife species.

This guide covers several wildlife habitat and food-planting management techniques. The techniques provide information to increase natural food production, supplement the diets of game species, improve recreation, and to manage populations to meet user objectives. This guide is based on proven wildlife management techniques and ongoing wildlife research and is written to provide information that will help meet recreational and management objectives.

### *Soil and Vegetation Disturbances*

Soil quality determines wildlife habitat and population potential. Soil disturbances, such as timber harvest, disking, mowing, and prescribed burning, can improve wildlife habitat, and, if you do it correctly, can reduce the need for food plantings. However, for the best vegetative habitat diversity and to help in wildlife harvest and viewing, you might want a mixture of both natural vegetation and food plots.

Disking can prepare seedbeds for planting and change the natural composition of plants by removing thicker, undesirable grasses and creating space for more desirable legumes and seed producers. Disking also increases insect production. The best method of disking is "strip disking." This technique works best with fields (pastures or agricultural) and rights-of-way but may also be used in stands of open timber. The key is to disk strips that are 30 to 50 feet wide to leave similarly undisked strips in between them. Do this alternately across the length of the field or area. You should disk strips every 3 years or so for quail.

Strip disking is excellent for providing nesting and broodrearing habitat, insect production, and important seed (food) production for quail and turkeys. As an example, blackberries, an important food to deer, turkeys, and quail, grow on an average 3-year rotation and can be promoted on a 3-year disking schedule. Aquatic plants (such as maidencane and smartweed), which are important duck foods at certain times, can be encouraged by spring and summer disking in drawdown ponds or marshy areas. Legumes (such as partridge pea, beggarweed, vetches), forbs (such as croton, ragweed), and large seeded grasses can be encouraged with winter-to-spring disking of fields and plots. Always disk on the contour to prevent or to minimize soil erosion.

Mowing is used primarily for the bobwhite quail and wild turkey. Late-winter (February) and late-summer (August) mowing attracts insects that are critical in the diets of juvenile birds. Late-summer mowing of grassy plots and fallow fields can increase nutrient availability of plants by providing fresh, green growth. The highest nutrient availability in grasses is in the first 8 inches of growth. Mowing can also help provide browse for deer.

Prescribed burning is the skillful use of fire to natural fuels, under confinement, to get planned benefits for forest or wildlife. Prescribed burning often is the most economical

and beneficial tool in wildlife management. It is also a controversial because of possible landowner liability and smoke management health concerns. Prescribed burning is often used in pine or upland mixed pine hardwood stands to reduce dry fuel hazards, to control hardwood competition, and to prepare sites for replanting of trees. Besides these timber management benefits, wildlife benefits include ground exposure, seed spread, legume spread, hardwood butt sprouts, and growth of nutrient-rich forbs, vines, and browse. **Only responsible, trained, experienced persons should do prescribed burning! Report all unattended fires to state forestry personnel.**

Landowners must have a burning permit to burn in any state. You can get the permit by contacting the state forestry agency. Also, several states, including Mississippi, have prescribed burn laws that might require training, certification as a burn applicator, and written plans before burning. Although a 1- to 2-year burning cycle is ideal for quail, an average 3- to 5-year burning schedule is best for maintaining habitat diversity for many other game species. A 3- to 5-year burning rotation consists of burning 1/3 to 1/5 of the habitat each year. By doing so, you maintain different plant stages in the habitat, ensuring enough food production and good reproductive, escape, and resting cover.

Here are some safe burning conditions that can bring greatest wildlife benefits:

1. Burning in January and February, when temperatures are lower than 40 °F.
2. Burning with wind speeds of 3 to 10 mph.
3. Burning with a relative humidity of 50 to 70 percent.
4. Burning at night when the humidity is higher, for safety reasons. (Note: Smoke is harder to manage at night, though.)
5. Burning with a backfire where possible.

Do not practice any of these during the critical March to August nesting periods for bobwhite quail, turkey, and other ground-nesting species of interest.

The goal is to keep fire between ground level and 18 inches high. Limit burning to fields or stands of pine at least 10 years old. Restrict fire from hardwood stands. Unlike southern yellow pines, the cambium layer of most hardwood species can stand only 120 °F of heat. The best wildlife burn is a patchy or incomplete burn, which will increase habitat diversity.

You can get professional help from state or federal agency wildlife biologists, forestry specialists, and private consultants. Many state forestry agencies will schedule and conduct burns on private lands for a small fee.

## Openings

Openings are various-sized areas in the habitat where sunlight reaches the ground. Openings are critical for a variety of species. They provide low growth that attracts insects and provides green forage and other foodstuffs near ground level for deer, quail, turkeys, and other species. Openings can vary in size from a few square feet to many acres. A list of a few different openings might include pastures, agricultural fields, power lines, gas lines, road rights-of-way, and timber harvest areas. For example, turkeys can thrive in forested habitats that have anywhere from 15 to 60 acres of opening per 100 acres of habitat.

These areas naturally provide food and cover for wildlife but can also be controlled or planted to various crops. For example, you can strip plow or mow them and/or plant to foliage, such as bahiagrass or clover that attracts insects. Bobwhite quail and turkeys often nest near these areas, which serve as good sources of food and cover.

Clearcuts (harvest cuts) can be used to create openings and, if planned and harvested properly, can provide diverse habitat edges, excellent cover for nesting, brood rearing, and escape, and lots of nutrient-rich forage/foods. Small, irregularly shaped harvest cuts with streamside management zones (strips of timber left along drains) provide excellent habitat, if these areas are part of a mix of different habitat types. Depending on initial tree spacing and site quality, an area that has been harvest cut might provide good quail habitat for up to 3 to 4 years after replanting. Later in the rotation, if pine is being grown, with proper thinning and burning, these areas can again provide excellent habitat. Best deer browse occurs 2 to 4 years following complete timber harvest, and food and cover benefits can continue for years with proper timber/wildlife management.

Group selection, individual tree selection, thinning, seed tree, and other methods of timber harvest can create small to large openings that can be suitable for planting. These harvests, when paired with other practices, such as burning, can magnify benefits to wildlife species.



*Forest openings provide important components for wildlife species and also can be suitable for planting supplemental forages.*



*Clear-cuts (harvest cuts), as shown in this aerial view, provide good, early successional habitat for some species. Streamside management zones (SMZ's) protect water quality and provide travel and feeding areas.*



*White-tailed deer are known to feed on more than 700 different species of plants and are characterized as browsers.*



*Supplemental forages (cool and warm seasons) can help meet late-summer and winter (stress periods) needs of white-tailed deer.*



*Blackberry (shown) and dewberry (*Rubus* species) are important native vines. They provide browse and fruit.*

*Honeysuckle (*Lonicera japonica*) is likely the most important vine in the Southeast for white-tailed deer and can be enhanced with fertilizer.*

Fruit-bearing hardwood trees, shrubs, and vines that provide food (including browse) for deer in the Southeast include the following:

#### Trees

Beech  
Black Cherry  
Black Haw  
Black Locust  
Crab Apple  
Dogwood  
Hackberry  
Honey Locust  
Mulberry  
Oaks  
Persimmon  
Redbud  
Red Maple  
Sassafras  
Wild Plum

#### Shrubs

American Beautyberry  
Elderberry  
Gallberry  
Rhododendron  
Serviceberry  
Sumac  
Witch Hazel

#### Vines

Blackberry  
Greenbriar  
Honeysuckle  
Muscadine  
Poison Ivy  
Virginia Creeper



## *White-Tailed Deer*

### Habitat and Food Requirements

The white-tailed deer (doe) has an average home range of at least 1 square mile (640 acres), while mature bucks may range more than 3,000 acres annually. When basic biological needs for white-tailed deer are met on a suitably sized unit of land, deer might be less likely to leave, unless pressured by people, environmental conditions, or other animals. Mature hardwood forests, mixed pine-hardwood forests, pine forests (including managed plantations and natural forest), and open fields are some habitat types useful in helping meet habitat requirements.

The white-tailed deer browses on grass and other plants. It has four stomachs that help digest various foods, making it versatile in its feeding habits. It eats a variety of leaves, twigs, bark, buds of trees and shrubs, plus hard and soft fruits, vines, forbs, lichens, mushrooms, cultivated crops, and some grasses.

As far as nutrition, the two most critical times for white-tailed deer are late summer, when deer population levels are high and food quality is poor, and late winter, when food quality and quantity are low and mast (fruit) from oaks and other trees is scarce. These are times food plots can be good for deer. If at least one percent of an area is planted in food plots, the plots can positively benefit white-tails.

During the spring and early summer, deer browse is high in protein and complex carbohydrates. At this time, weights are increased for winter. Body fat stores are increased during the fall and early winter months with a variety of mast crops, including red and white oak acorns, which are good sources of carbohydrates.



*Wild turkeys pick up seed heads, green forage, and insects in grassy openings. Hens prefer to nest near openings.*

## *Eastern Wild Turkey*

### Habitat and Food Requirements

The eastern wild turkey has an average home range of about 1,500 to 3,000 plus acres, with hens having smaller home ranges on average than mature gobblers. It is hard to manage wild turkey populations on small tracts of land, but it can be done. Protection with gates and other ways to control access is critical to managing wild turkey populations.

The ideal habitat for turkey production includes a mixture of intensively managed (thinned and burned) pine plantations, natural pine forest, mixed pine-hardwood forest, mature hardwood forest (upland, bottomland, or creek bottom) for travel and mast production, and properly maintained roadsides and openings for reproductive, broodrearing, and feeding areas.

Openings are an important part of wild turkey habitat, and you will need several small and large permanent openings. A range of 25 to 50 percent of the total area to be managed for wild turkeys should be in small to large, permanent, grassy openings. You can easily manage turkeys, even if timber is your main objective. You can leave a streamside management zone (SMZ) when you harvest timber. SMZ's can include hardwoods and/or pines left along creeks and drains to protect water quality and to provide travel paths and mast production for wildlife.

Turkeys often use intensively managed plantations that are thinned and burned as production areas (nesting, brood rearing, feeding). You can burn in pine stands as young as 10 years old. You can do commercial thinning early (13 to 17 years) in the rotation. Salvaged pine beetle (bug) spot areas, log loading decks, skid trails, and roadsides provide openings you can maintain in food plantings.

The eastern wild turkey is a strong scratcher and needs a diet of animal and plant matter. During their first 2 weeks of life, turkey poults feed almost entirely on protein-rich insects. After 4 weeks old, they need a diet like those of adults, which feed mainly on a wide variety of plant matter (seeds, leaves, fruits, tubers, forbs, grasses) and insects. In addition to grassy "bugging" areas, summer and winter food plantings that provide desirable foliage, fruit, and seed production are beneficial. During fall and early winter months, turkeys use mast crops of oaks, pines, and several other fruit-producing trees and shrubs (such as dogwoods and huckleberry).

Fruiting trees, shrubs, forbs, grasses, and vines in the diets of the wild turkeys include the following:

#### **Trees and Shrubs**

American Beautyberry  
 Autumn Olive  
 Barberry  
 Black Cherry  
 Black Gum  
 Black Locust  
 Crab Apple  
 Dogwood  
 Hawthorn  
 Honey Locust  
 Mountain Ash  
 Oaks  
 Persimmon  
 Pine  
 Redbud  
 Russian Olive  
 Serviceberry  
 Sumac  
 Wild Plum  
 Yaupon

#### **Forbs and Grasses**

Aquatic Sedge  
 Bahiagrass  
 Beggarweed  
 Bluestem  
 Johnsongrass  
 Lespedeza  
 Milk Pea  
 Orchard Grass  
 Panic Grass  
 Partridgeberry  
 Partridge Pea  
 Pokeweed  
 Ragweed  
 Vetch

#### **Vines**

Blackberry  
 Honeysuckle  
 Muscadine  
 Poison Ivy  
 Virginia Creeper



*Field edges that have grown up around wood lines provide important cover for the bobwhite quail.*

## *Bobwhite Quail*

### Habitat and Food Requirements

The bobwhite quail has an average home range of about 40 acres, but quail might stray from these areas if the habitat doesn't meet certain requirements. Bobwhites are an easy game bird to manage on smaller tracts of land. Population numbers have been declining over the last 30 years, and the decline has increased over the last 10 years.

Bobwhites are an "edge" and early successional stage species and need a mixed pattern of open ground and weedy/grassy habitat and/or open (thinned and burned) timber. The best basal area (cross sectional square footage of trees on a per acre basis) for quail is a range of 40 to 60 square feet per acre. It is difficult to produce quail long term in short rotation pine pulpwood stands.

Harvest cut areas can provide good habitat and hunting for quail for up to 3 to 4 years after harvest, though. With proper management, these areas might provide good numbers of birds for 5 to 6 years. For sawtimber rotations, thinning, prescribed burning, mowing, and disking are beneficial quail management techniques where timber is the key objective.

The bobwhite quail favors patchy farming techniques where you keep 5-acre and smaller patches of different early successional habitats to include an abundance of brushy fence rows, ditch banks, and strips of open timber separating

fields. Loss of suitable habitat because of clean farming techniques, loss of small farming operations, and other changes in land-use patterns have limited bobwhite quail populations.

The most critical factors in quail management include providing the right mix (mosaic) of habitat to meet food, bare ground, and cover needs. Quail will not venture far out into a large, open field to feed because of lack of cover. Neither can they scratch out foods in areas of heavy cover, if the seeds are available. You can ease these situations by mixing habitats and by creating transitional zones in the habitat. A transition is a middle habitat between two types of habitat.

The following are suggestions where transitional zones improve quail habitat:

- Build several long fences (preferably wooden, in a criss-crossed pattern) and let them grow up in vegetation. You can enhance this by fertilizing and planting rows of shrub lespedeza, honeysuckle, or muscadine on both sides of the fence row. Leave a buffer strip of 10 to 30 feet on both sides of the fence. You can plant this area to desirable seed-producing plants or perennial grasses that attract insects and can be mowed in late winter. A good substitute for fences would be to push up windrows where cut slash is available.

- Let field edges grow up next to wood lines.
- Build brush piles in large open fields or harvest cut areas, then let a buffer grow up around the brush pile.
- Plant 6 to 10 rows of pines in open fields, bordered by strips of annual reseeding lespedeza or broom sedge.
- Leave 30-foot buffer zones between cultivated crops and trees alongside ditch banks, roadsides, or fence rows.

Bobwhite quail, as do wild turkeys, eat animal and plant matter. Quail chick diets are mainly insects for the first 2 weeks of life. After about 8 weeks, their diets are more like those of adults. Adult quail diets, although supplemented by insects, are seeds, fruits, acorns, forbs, and grasses/green matter. Food plantings that attract insects and produce green stuff and seeds can be beneficial at all times during the year, especially in late summer, when nesting and brood rearing are complete. In the Southeast, free water is not generally considered critical for bobwhite quail habitat. Although quail will drink available water, they can hold enough water from fruits, dew on foliage, and insects to meet their needs.

Numerous wild plants, trees, and shrubs are good food sources for bobwhites. You can produce many of these native plants by seasonal diskings.



*The bicolor lespedeza plot in the center of this thinned pine stand provides cover and an important winter food source (seeds).*

**Trees, shrubs, forbs, and grasses that provide important food and/or cover for bobwhites include the following:**

#### **Trees and Shrubs**

American Beautyberry  
 Autumn Olive  
 Barberry  
 Black Cherry  
 Black Gum  
 Crab Apple  
 Dogwood  
 Gallberry  
 Hawthorn  
 Huckleberry  
 Magnolia  
 Mountain Ash  
 Mulberry  
 Oaks  
 Persimmon  
 Pine  
 Privet  
 Redbud  
 Russian Olive  
 Serviceberry  
 Sumac  
 Sweet Bay  
 Wax Myrtle  
 Wild Plum  
 Yaupon

#### **Forbs and Grasses**

Beggarweed  
 Butterfly Pea  
 Bluestem  
 Common Ragweed  
 Cranesbill  
 Croton (Dove Weed)  
 Goldenrod  
 Johnsongrass  
 Lespedeza  
 Milk Pea  
 Panic Grass  
 Partridgeberry  
 Partridge Pea  
 Poison Oak  
 Pokeweed  
 Vetch



*This grain sorghum field was established by disking, broadcasting seeds and fertilizer, and then covering the seeds with a disk drag.*

## *Mourning Dove* Habitat and Food Requirements

Mourning doves are migratory game birds that usually migrate through the Southeast from early fall through winter. Even so, many will nest in the Southeast and have habitat requirements that must be met. Doves need “grit” (small bits of gravel and larger grains of sand) in their diets to help grind food in the gizzard. Doves are often seen on sand and graveled roadsides and in gravel pits. Also, a water source (such as a farm pond) is needed within approximately one mile of the food source. Doves are herbivores and are characterized as seed eaters. They feed primarily on the seeds of forbs, grasses, and small grains. Doves prefer to light in areas where the ground is bare and then walk to the food source. A large machine-harvested field attracts doves because of the clean ground and scattered seeds. Doves seek food by sight, prefer clean ground, and will not scratch or dig in the ground for food.

Doves are federally regulated migratory birds, and you should place extreme care and attention on federal and state regulations regarding dove field management. Consultation with wildlife biologists or enforcement officers might help avoid illegal field situations. Normal and acceptable agricultural practices typically have been considered legal dove shooting areas.

It is important to plant summer grain crops no later than June 15, if you want to attract doves to fields for dove shoots in September. Doves are easily attracted to prepared grain fields of at least 10 acres, and larger fields will attract proportionately greater numbers of birds. Planting techniques should use small seed and grain crops such as browntop millet, grain sorghum, corn, and sunflower. Crop production will be maximized if drilled, but broadcasting seeds, followed by light disking and dragging, will produce acceptable results. Harvests of portions of the field beginning 6 to 8 weeks in advance of expected shooting dates and continuing weekly until the shooting date might help hold doves on the field. Waste grain and bare ground are critical to the doves using the field.

Dove fields can easily be overharvested but can be retained by using a harvest schedule. Schedules might include shooting only in afternoon hours, regulating all-day shoots (if legal) to one per week, or stopping shoots at least 1 hour before sunset to allow doves time to feed and water before roosting.



Wood ducks are cavity nesters and readily use man-made boxes. A metal guard will deter predators.

# Waterfowl

## Habitat and Food Requirements

The mallard and wood duck are two of the most popular species of waterfowl in the Southeast. Both of these ducks are herbivores, are characterized as grazers and seed eaters, and have diverse diets of grasses, forbs, seeds, fruits, acorns, cultivated crops, and aquatic plants. Mallards and wood ducks are further characterized as dabbling ducks or puddle ducks, and feed in shallow water.

Waterfowl are federally regulated, migratory species, and most nest from the northern tier of the United States into Canada. Wood ducks, however, also nest in the Southeast in great numbers, and, unlike most waterfowl (which are ground nesters), use natural tree or man-made cavities. The number of wood ducks can be increased by providing nest boxes around water sources where there are inadequate numbers of natural cavities.

Cover, food, and shallow water are habitat requirements important for waterfowl impoundment management. Farm/beaver ponds and other impoundments of at least 5 acres can be made attractive to waterfowl. Food plantings of corn, Japanese millet, and other small grains planted around the edges and in these impoundments can provide excellent habitat and good hunting. Those trees not producing small acorns and other duck foods can be removed from the pond's edge to allow seed-producing weeds and grasses to flourish. Water levels where beavers are active can be controlled by using the Clemson drain or similar devices.

One of the best techniques used in waterfowl management is the greentree reservoir. This technique involves constructing a levee in a hardwood drain or bottom (with an adequate water source such as a creek, sizeable watershed, or well) that contains oaks and other small, hard mast-producing trees and shrubs. Water levels are controlled via a structure such as a weir or flashboard riser. The timber is flooded in the fall to an average depth of about 18 inches and often attracts good numbers of dabbling ducks, depending on mast crops. Do not continue flooding longer than 4 to 5 months, to prevent timber damage. Landowners and clubs interested in this technique can receive technical and often material assistance regarding location, permits required, and/or cost estimates from the Natural Resource Conservation Service, Cooperative Extension Service, state wildlife agency, Ducks Unlimited, and U.S. Fish and Wildlife Service. Most of these areas are considered wetlands and might require federal and state approvals before development.

Similar techniques can be used with agricultural production areas, pastureland, and with any impoundment that has a water-control structure. These areas can be drained by March 1, and native food production can be promoted by disking and fertilizing the soil, or they can be planted to crops that will tolerate some flooding.

Some wild plants in wet areas or drawdown ponds are beneficial to ducks and might be enhanced by mechanical soil disturbance.

### Crops that can tolerate some flooding include the following:

- Browntop Millet
- Buckwheat
- Cattail Millet
- Chufa
- Corn
- Egyptian Wheat
- Grain Sorghum
- Japanese Millet
- Joint Vetch
- Rice
- Soybeans

### Wild plants that might be enhanced by mechanical disturbance:

- Aquatic Sedge
- Arrowhead
- Alligator Weed
- Asiatic Dayflower
- Barnyard Grass
- Bladderwort
- Bullrush
- Coontail
- Duckweed
- Maidencane
- Pickeral Weed
- Pondweed
- Saw Grass
- Smartweed
- Tearthumb
- Water Primrose
- Watershield



*You can seed Japanese millet seed directly onto mud flats around ponds or in wet fields for waterfowl.*

*Soil testing, with follow-up treatment, will improve cost effectiveness, production, and use of food plantings. Contact your Extension office or NRCS office for kits and information.*



## Supplemental Forages

Research indicates clearly that no one particular supplemental forage variety can meet all the needs of any one wildlife species on a year-round basis. However, combining different forages in food plantings, including warm and cool season forages, is an excellent way to maximize benefits of food plantings. Selections of adapted varieties should be based on soil and site characteristics, as well as cost and the wildlife species managed. Experiment with different varieties and planting combinations. Initially, plant small areas to serve as test plots before establishing large acreages.



## Soil Quality and Fertilization

Wildlife seek and consume foods that are high in nutrient content. Since plants and animals are by-products of soil quality, determining soil quality and correcting problems in fertility and pH are the first steps in food-plot preparation.

*Fertilize food planting based on the soil test recommendations. A small tractor and broadcast spreader will access most remote locations.*

To test soil quality, collect soil samples 3 months before planting. Soil testing kits are available from the Extension Service or Natural Resource Conservation Service. One way to sample soils is to collect a handful of topsoil from 3 to 5 locations throughout the plot. Mix the soil in a container and remove a small sample (handful) to go in a small bag. Label the container with name and address and include the plant variety to be planted in the plot (s). Soil test results can give different NPK and lime (pH) rates for particular plant varieties. Contact the agencies listed for information on analysis of samples.



Planting food plots without proper fertilization and liming wastes time and money and, in most cases, is of little value to wildlife. In addition to fertilizing food plantings, fer-

*Many of the soils in the Southeast are acidic and need liming periodically to allow maximum forage production, quality, and to encourage annual reseedling.*



tilizing native vegetation in fallow fields, along roadsides, fence rows, and wooded areas with scattered openings also has benefits. Honeysuckle, for example, is an excellent wild vine to fertilize for deer forage production. If you cannot get a soil test, for most cereal grains, use a good complete fertilizer with equal amounts of nitrogen, phosphorous, and potassium applied at the rate of 200 to 400 pounds per acre. NPK is expressed as a number on the fertilizer sack, such as 15-15-15. Most legumes, however, require only low nitrogen levels, such as 6-24-24.

Liming involves applying agricultural lime (if needed) to bring up soil pH to the proper level to maximize growth, yield, fertilizer efficiency, and palatability of food plantings. For slightly acidic soils, applying 2 to 4 tons per acre is generally required to adjust pH to the proper level. Many clovers need a pH of 6.5 to 7.0 to promote reseeding.

## Food Plot Size, Shape, and Placement

Match food plot size to the animal species you are managing. The size of food plots can vary from a few square feet to 20 or more acres. Deer, for example, will best use a 1- to 3-acre plot every 100 acres, and quail will best use a ¼- to ½-acre plot every 15 to 20 acres. Generally, plans should address a percentage of the total area managed and/or controlled to be planted in food plots. Plant at least one percent of the managed area in food plots for deer.

For greatest plant diversity and cover, plant long, narrow plots between two or more types of timber stands. For example, plant a plot between a stand of hardwoods and a stand of pine, between two separate ages of pine stands, or on the edge of a clear cut near the surrounding timber. Planting fruit- and nut-producing trees and shrubs in plots can add diversity and increase wildlife use of these plantings.

Food-planting locations that might not impact timber production very much include wide fire lanes, rights-of-way of gas and power lines, logging roads, old log-loading decks, and small, salvaged spots of timber. You can also overseed permanent roadsides. Do not plant food plots next to public roads, since these plots are too easy to get to. You should control access to plots by gates and fencing placed at least 100 yards inside property boundaries.

Food plantings located near drains, bottomland, or flat-wood sites usually are more productive because of soil fertility and topsoil depth. Unless you can reduce soil movement to insignificant levels, don't locate food plots on steep slopes that might erode. Unless waterfowl is the target species,

don't plant areas that routinely flood. Available sunlight is a major consideration in food-planting placement. Although some plants and shrubs are shade tolerant, most are not.

## Preparing Food Plots

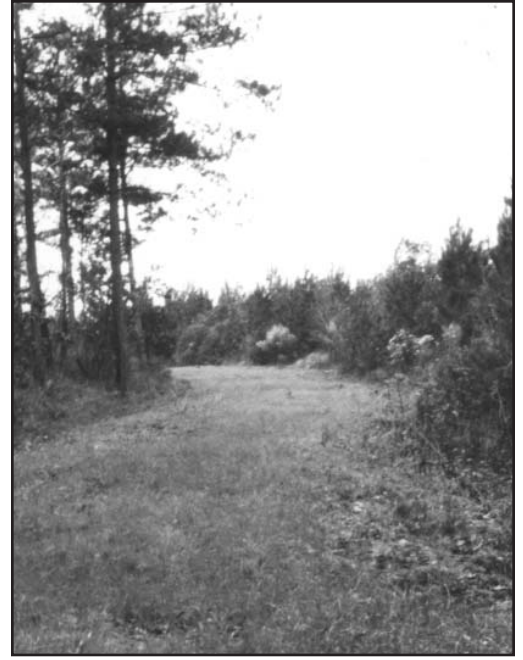
Some farm equipment is needed to plant and maintain wildlife food plantings. A tractor large enough to pull 5-foot implements is sufficient in most cases. Useful implements include a heavy-duty mower, disk, broadcaster (seeder), and a planter or drill with at least two rows. Although a row planter or drill is not essential, for most plantings it can be useful in making productive grain plots, and you can use it to plant areas that are level with little soil preparation (low till).

A hand seeder is also useful for planting small-seeded crops, such as clovers, or for seeding remote, wet, or steep areas. Direct seeding can be feasible for small seeded plants and might not require disking or other soil preparation. You can use direct seeding (no till) on roadsides, fire lanes, or other areas with freshly disturbed soils. Roadside food-planting management will provide edges, openings, and food for wildlife, as well as help control erosion of roads and ditches. Disk roadsides only along flat stretches and away from ditches. Fertilize and plant in a desirable grass, legume, or seed-producing plant. Cover with wheat straw or other type mulch to help prevent erosion and to hold seeds in place.

Soil-preparation techniques useful for food plots include fallowing and preparing firm seedbeds. Fallowing builds and maintains soil before planting legumes and is done by letting fields or plots lay out several months before planting. You can disk plots before planting time. To prepare firm seedbeds, let disked plots settle before planting. Usually this happens with one good rain and several days of sunshine. Lightly cover seeds by dragging a piece of railroad iron or a piece of chain link fence behind the seeder. Five tires chained together in a V will also cover seeds and help level plots.



*It is important to locate food plots well away from public roads and place them (plots) where foods are needed (such as this young pine plantation).*



*This fire lane ryegrass planting can benefit timber and wildlife. It serves as a wide, green firebreak and a long food plot.*



*Adding sawtooth oak trees to this wheat plot adds diversity in the form of cover and a late-winter hard-mast component.*



*One percent of an area planted to year-round deer forages will positively impact the nutritional plane and response of white-tailed deer.*

# Wildlife Food-Planting Mixtures/Strip Planting

Food plots planted with two or more crops or mixtures provide diverse food and cover and often are used by more wildlife species than a one-crop field. These mixed plots can provide year-round use on smaller acreage. When planted, if one crop does not make, a second or third probably will produce. The better technique used for mixing crops is strip planting. Plant several long strips about 30 to 40 feet wide to alternating crops.

The following plant mixtures work well in a single plot. If you plant them together rather than in strips, there will be some competition.

Mixes	Planting Dates
Deer and Turkey	
Forage Cowpeas, Alyce Clover, Joint Vetch	May 1 to June 15
Arrowleaf, Red Clover, Crimson Clover, Ryegrass, Wheat	Sept. 1 to Nov. 1
Regal or Osceola (moist area), Ladino Clover, Ryegrass, Oats	Sept. 1 to Nov. 1
Bobwhite Quail and Mourning Dove	
Sunflower, Grain Sorghum, Browntop Millet	April 15 to May 15
Egyptian Wheat, Quailhaven Soybeans	April 15 to June 1
All Species	
Corn, Soybeans	April 1 to June 1

The following mixtures contain at least one excellent soil holder, several perennials, annual reseeder, and several good wildlife food plants. They are designed for the least site preparation and are small seeded, so you can distribute them with a hand seeder or a broadcaster and tractor. These are excellent for planting on roadsides, disked fire lanes, or log decks. You should cover plantings with wheat straw and fertilize, if direct seeded, for greatest benefit. Application will be around 60 pounds per acre for the total mix, and the cost will be in the \$1 to \$1.50 per pound range. Plant large seeded crops first, cut in, then apply small seeded crops (clovers) on top and cover lightly.

These plant mixtures are for minimal site preparation and are small seeded, so you can distribute them with a hand seeder or a broadcaster and tractor.

Planting Dates	
<b>Late-Winter Mix</b>	<b>February to April</b>
Orchard Grass, Korean Lespedeza, Kobe Lespedeza, Ladino Clover, Red Clover, Ryegrass, Alyce Clover (optional)	
<b>Late-Spring Mix</b>	<b>May to June</b>
Browntop Millet, Buckwheat, Korean Lespedeza, Wildflowers (optional)	
<b>Fall Mix</b>	<b>September to November</b>
Orchard Grass, Ladino Clover, Red Clover, Crimson Clover, Ryegrass, Wheat, Nebraska Rye, Meechee Arrowleaf Clover (optional)	

**Note:** Consult a wildlife biologist or local seed dealer before buying prepackaged, high-priced seed mixtures. Check bag contents and prices with several vendors. Often a seed dealer can customize seed mixtures at a much lower price while maintaining the same or similar contents as prepackaged mixes.

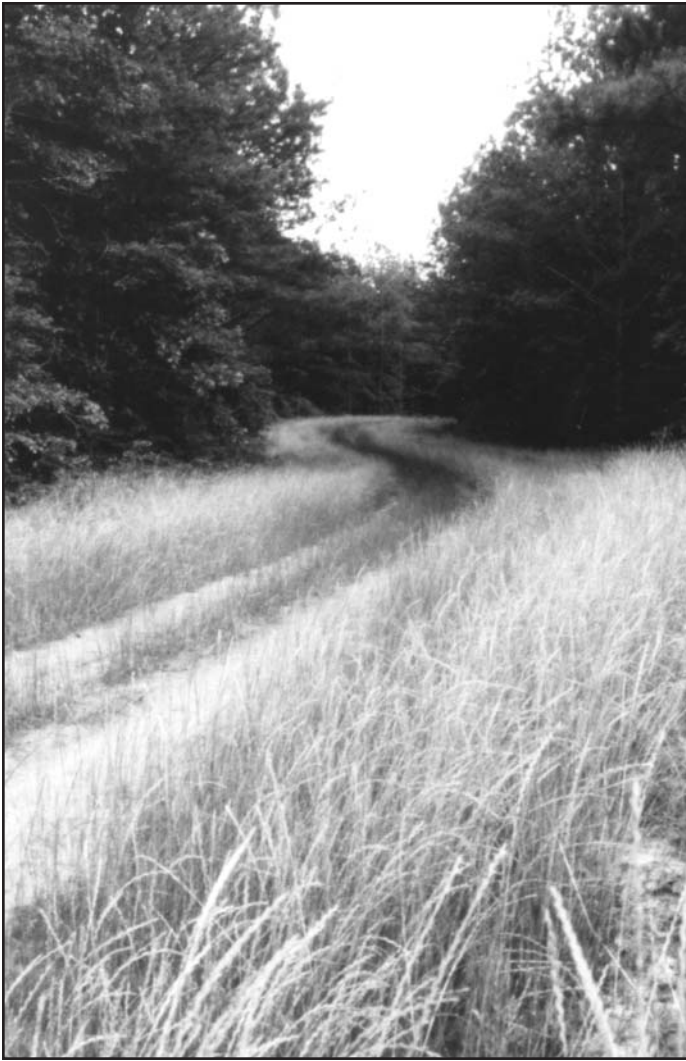
## Plant Applications

**Cool-season annuals** are planted in late summer and early fall to provide forage and seed crops for fall, winter, and spring uses. These often make the best mixtures.

Before planting **legumes**, inoculate the seeds with a plant-specific packet of inoculum-containing bacteria (rhizobium) that fix nitrogen to the nodules of legume roots and allow nitrogen production and intake by plants. Inoculation of legume seeds will increase production of legumes, decrease fertilizer cost, and build soil quality. Mix the packet with a small amount of water or sugar water, then mix thoroughly with the seed just before planting. Avoid fertilizer contact with inoculated seed, if possible.

**Perennial plants** will continue to sprout each year after establishment. Some fertilizing and liming are required for continual growth. Periodic competition control, such as mowing or disking, is often needed.

**Warm-season annuals** are planted in early to late spring to provide forage and seed crops for summer and fall uses.



*This secondary road is planted to gulf ryegrass for erosion control and wildlife management. Access is controlled with gates.*



*Alyce clover is one of the better warm-season forages for white-tailed deer.*



*Cereal grains such as wheat, oats, and rye are often chosen for cool-season plantings.*



*Quailhaven soybeans and milo are mixed in this planting.*



Corn is popular as a planting because a variety of wildlife species use it, and it is highly desirable. It is a good source of carbohydrates but is low in protein.



Egyptian wheat will grow in many locations and in late winter provides good cover and food for bobwhites.



This stand of Japanese millet was planted for waterfowl.



This young 5-year-old stand of sawtooth oaks is starting to produce acorns.

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# Planting Materials Guide

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## Alfalfa

### Companion plants

None; do not mix with other plants.

### Description

A cool-season perennial legume, widely used by deer and turkey in the spring, summer, and fall. Provides nesting habitat, seeds, insects, and foliage for turkeys.

### Fertilization

Soil tests are necessary; generally requires 150 pounds of phosphorus and 300 pounds of potassium per acre.

### Lime requirements

Apply according to soil test or use amounts necessary to bring soil pH to 7.0.

### Management

Mowing is required in early spring and late summer to keep shoots green and tender. Apply 75 pounds of (P) and 150 of (K) per acre annually after the first mowing.

### Planting dates

September 1 to October 15.

### Planting rates

Alfalfa inoculant required. Drill 15 pounds per acre at 1/4 of an inch, or broadcast 18 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Requires fertile, well-drained soils; not suited to heavy clay or wet soils.

### Soil preparation

Disk plot in June and leave plot fallow until planting date; redisk and plant in a firm seedbed.

### Varieties

Apollo, Vanguard, and Florida 77.

## Austrian Winter Peas

### Companion plants

Perennial grasses.

### Description

A cool-season annual legume. Provides excellent fall, winter, and early spring foliage for deer and turkeys. Seeds mature from May to June.

### Fertilization

A soil test is recommended, or use 250 pounds per acre of 0-14-14.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0-7.0.

### Planting dates

September 1 to November 1.

### Planting rates

Vetch inoculant required. Drill 40 pounds per acre at 1/2 of an inch, or broadcast 40 to 60 pounds per acre; cover 1 inch.

### Soil adaptation

Better adapted to heavy clay; moderately fertile to fertile soils.

### Soil preparation

Plant in a well-disked seedbed.

## Bahiagrass

### Companion plants

Clovers, winter peas, and annual lespedeza.

### Description

A warm-season perennial grass. Used heavily by wild turkeys as a source of insects and choice seeds.

### Fertilization

A soil test is recommended, or use 400 pounds per acre of 13-13-13 or 15-15-15.

### Lime requirements

Apply according to soil test or to maintain a soil pH of 5.5-6.0.

### Management

Mow in early spring and late summer. Apply 150 pounds per acre of 34-0-0 annually after first mowing.

### Planting dates

March 1 to June 1; September 1 to November 1.

### Planting rates

Drill 15 pounds per acre at 1/4 of an inch, or broadcast 18 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Well adapted to most soils; best stands are obtained in sandy soils.

### Soil preparation

Plant in a firm seedbed.

### Varieties

Argentine, Paraguay, Pensacola, and Wilmington.

## Barley

### Companion plants

Ryegrass, clover, and vetch.

### Description

A cool-season, annual small grain. Provides choice seeds for game and nongame birds and choice foliage for deer in early stages of growth. Barley is tolerant to cold weather.

### Fertilization

Soil tests are recommended, or use 60 pounds of (N), 80 pounds of (P), and 80 pounds of (K)/acre.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 5.5 to 6.5.

### Management

(Optimal) Apply 120 to 200 pounds per acre of 34-0-0 in February.

### Planting dates

September 1 to November 1.

### Planting rates

Drill or broadcast 1.5 bushels or 80 pounds of seeds per acre and cover 1 inch.

### Soil adaptation

Adapted to well drained, light textured soils. Does not grow well in poorly drained or heavy clay soils.

### Soil preparation

Plant in a well disked seedbed.

## Bird's-Foot Trefoil

### Companion plants

Ryegrass, clover, and vetch.

### Description

A cool-season perennial legume. Mostly planted for quail and turkey. Provides a good source of foliage and insects. Grows to heights of 2 feet.

### Fertilization

Soil tests are necessary. Generally, 75 pounds of (P) and 150 pounds of (K) are required.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Management

Mow in early spring and late summer.

### Planting dates

September 1 to October 15.

### Planting rates

Inoculation required. Drill or broadcast 12 pounds per acre, and cover seed 1/4 of an inch.

### Soil adaptation

Most productive in the mountain and Piedmont regions. Adapted to well-drained soils.

### Soil preparation

Disk plot in June and leave fallow until planting date. Redisk and plant seeds in a firm seedbed.

### Varieties

Fergus, Empire, and Viking.

## Buckwheat

### Companion plants

Sunflower, millets, and grain sorghum.

### Description

A warm-season annual grain. Used by deer, turkeys, waterfowl, quail, and doves. Hard to establish when deer populations are high.

### Fertilization

Soil tests are recommended, or use 200-300 pounds per acre of 13-13-13 or 15-15-15.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Planting dates

May 1 to June 1.

### Planting rates

Drill 30 pounds per acre at 1/4 of an inch, or broadcast 40 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Widely adapted to fertile and infertile soils. Grows best on well-drained sites.

### Soil preparation

Plant in a firm seedbed.

## Burnett

### Companion plants

Clovers.

### Description

A warm-season perennial forb planted mainly for quail. This is a small, creeping, seed-producing plant.

### Fertilization

A soil test is recommended, or use 150 pounds per acre of 13-13-13 or 15-15-15.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Planting dates

March 1 to May 1.

### Planting rates

Drill 4 pounds per acre at 1/4 of an inch, or broadcast 6 pounds per acre and cover 1/4 of an inch.

### Soil adaptation

Requires fertile, well-drained upland soils.

### Soil preparation

Plant in a firm seedbed.

## Puna Chickory

### Companion plants

Oats, Crimson, or Ladino clover

### Description

Perennial herb; a member of the lettuce family. Selected for high yields in New Zealand. Planted in the fall, grows slowly until spring, then grows rapidly until it blooms in late summer. May last up to 3 years.

### Fertilization

Soil tests are recommended, or use 50 units of nitrogen fertilizer every month.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Management

When stand declines, reseed in fall and cover lightly.

### Planting dates

August 15 to October 31.

### Planting rates

Plant 5 to 6 pounds per acre, and cover 1/4 of an inch.

### Soil adaptation

Prefers well-drained site with good water-holding capacity.

### Soil preparation

Plant in a firm, smooth seedbed prepared by plowing and dragging. Broadcast seed, and cover lightly.

## Chufa

### Companion plants

Grows best alone.

### Description

A warm-season sedge. Chufa produces small, underground, nut-like tubers. These are choice foods for turkey, deer, and ducks, and are even tasty to humans. Chufa is also a delicacy to raccoons and can be severely damaged if plots are small and raccoon populations are high.

### Fertilization

Soil tests are recommended, or use 300 pounds per acre of 13-13-13 or 15-15-15.

### Lime requirements

Apply according to soil test, or use amounts necessary to bring soil pH to 5.5 to 6.5.

### Management

You can often have second-year crops by disking in February to March and reapplying 100 to 150 pounds per acre of 13-13-13 or 15-15-15. Rotate crops to avoid nematode infestations.

### Planting dates

April to May.

### Planting rates

Plant 30 pounds per acre in 24- to 36-inch rows at 9-inch spacings, or broadcast 50 pounds per acre and cover seeds 1 inch.

### Soil adaptation

Grows on well-drained to moderately well-drained soils; can be flooded if duck hunting is desired.

### Soil preparation

Plant in a well-disked plot.

## Clovers

*Note: Clovers are excellent forages that provide high protein levels in winter for deer. Clover can be mixed with other cool-season annuals. The clovers discussed in this publication are best suited for the Southeast. Clover is expensive, ranging from \$1.70 per pound to \$2.50 per pound. Be careful to check clover prices carefully. Mixes packaged and marketed to produce trophy animals carry high price tags and often can be mixed at local seed dealers for half the cost. Clovers are site specific and perform best when you use lime to correct pH problems.*

## Alyce Clover

### Companion plants

Plant with forage cowpeas and/or joint vetch. Reduce seeding rate to 10 pounds per acre when planting combinations.

### Description

A warm-season legume that provides forage in the summer and early fall. Especially important to whitetailed deer; one of the few warm-season forages that holds up well to grazing pressure.

### Fertilization

Apply according to soil test, or apply 200 pounds per acre of 0-14-14 after planting is established.

### Lime requirements

Apply according to soil test, or apply amounts necessary to bring pH to 6.5-7.0.

### Planting dates

May 1 to June 15.

### Planting rates

Inoculate seeds. Broadcast 15 to 20 pounds per acre, or drill 16 pounds per acre.

### Soil adaptation

Suited to most moderate to well-drained soils, including bottomland sites.

### Soil preparation

Disk and plant in a firm seedbed.

## Arrowleaf Clover

### Companion plants

Ryegrass, barley, oats, wheat, and rye; although these will often outcompete clovers.

### Description

A cool-season, reseeding annual legume. Grows to heights of 40 to 50 inches under fertile conditions. Seeds germinate in the fall, and plants grow slow in winter, then grow rapidly in spring. Flowers are white and pink. Seeds mature from late June to early August. Arrowleaf provides excellent foliage that attracts insects for turkeys and produces choice forage for deer, although palatability might be lower than some other clovers.

### Fertilization

Apply according to soil test, or apply 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or apply amounts necessary to bring soil pH to 6.5 to 7.0 to ensure reseeding.

### Management

Reseeding may be enhanced by bushhogging or light disking and fertilizing at the rate of 200 pounds per acre of 0-20-20 in October the following year.

### Planting dates

September 1 to November 15.

### Planting rates

Arrowleaf inoculant required. Drill 6 pounds per acre at 1/4 of an inch, or broadcast 6 to 8 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Best suited to fertile, well-drained soils. Grows best in sandy loams and light clay soils.

### Soil preparation

Disk plot in July and leave fallow until planting date. Redisk and plant seeds in a firm seedbed.

### Varieties

Meechee, Yuchi, Amclo, and Chief.

## Ball Clover

### Companion plants

Grasses.

### Description

A rapid growing, cool-season annual legume that grows on sites not suitable to other clovers. Provides foliage and insects for turkeys and forage for deer.



## Fertilization

Apply according to soil test, or use 200 pounds per acre of 0-20-20.

## Management

Reseeding can be encouraged by mowing or disking and fertilizing at the rate of 300 pounds per acre of 0-20-20 in September.

## Lime requirements

Apply according to soil test, or use amounts necessary to bring soil pH to 6.0.

## Planting dates

September 1 to November 15.

## Planting rates

White clover inoculant required. Drill 3 pounds per acre at 1/4 of an inch, or broadcast 3 to 4 pounds per acre and cover 1/2 of an inch.

## Soil adaptation

Adapted to a wide range of soils. Grows in heavy clays, poorly drained soils, and light-textured soils.

## Soil preparation

Plant in a well disked plot, or broadcast over a closely mowed grass.

## Crimson Clover

### Companion plants

Ryegrass, small winter grains, other clovers, and vetch.

### Description

A cool-season annual legume. Tolerates acidic soils. Provides insects and foliage for turkeys and forage for deer. Has pink-red blossoms and grows to heights of 3 feet. This is an excellent crop to plant to control erosion and beautify roadsides. Can be used in combination with other clovers, since it initiates growth quicker, but seeds out earlier than most clovers.

### Fertilization

A soil test is recommended, or apply 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts necessary to bring soil pH to 6.5 to 7.5.

### Management

Reseeding may be enhanced by disking or mowing the following fall. Apply 150 pounds per acre of 0-20-20 after soil disturbance.

### Planting dates

September 1 to November 15.

### Planting rates

Inoculation required. Drill 15 pounds per acre at 1/4 of an inch, or broadcast 20 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Best adapted to fertile, well-drained soils. Grows in loamy clay and heavy clay soils. Does not grow well in sandy soils.

### Soil preparation

Plant in a firm seedbed. Can be planted immediately following summer pea crops with one disking.

### Varieties

Autange, Chief, Dixie, and Tibbee.

## Red Clover

### Companion plants

Red clover grows best alone but can be planted with dallisgrass.

### Description

A cool-season legume. Provides insects and foliage for turkeys and forage for deer.

### Fertilization

A soil test is recommended. Apply 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0 to 6.5.

### Management

Mow in October and fertilize at the rate of 200 pounds of 0-20-20 per acre.

### Planting dates

September 1 to November 15.

### Planting rates

Requires a red clover inoculant. Drill 8 pounds per acre at 1/4 of an inch, or broadcast 810 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Grows best on fertile, well-drained soils. Does not grow well on sandy soils. Prefers a sandy, clay loam.

### Soil preparation

Disk plot in July and leave fallow until planting date; redisk and plant in a firm seedbed.

### Varieties

Kenland and Redland II.

## Subterranean Clover

### Companion plants

Warm-season perennials, ryegrass, cool-season winter grains, and vetch.

### Description

A cool-season annual legume; very tolerant to shade; can be planted on temporary food plots, such as logging roads, and in strips of thinned timber. Makes excellent plots in short-rotation pine and provides foliage and insects for quail and turkeys and forage for deer.

### Fertilization

Soil test recommended, or apply 250 pounds of 0-20-20 per acre.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 6.5 to 7.0.

### Management

Reseeding can be enhanced by mowing or fall disking and fertilization of 200 pounds per acre of 0-20-20.

### Planting dates

September 1 to October 15.

### Planting rates

Requires subterranean inoculant. Drill 8 pounds per acre at 1/4 of an inch, or broadcast 15 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Best adapted to well-drained, sand, loam, or clay soils.

## Soil preparation

Plant seeds in a well-prepared, firm seedbed.

## Varieties

Mount Barker, Woogenellup, Tallarook, Nangech, and Meterora.

## Ladino Clover/White Clover

### Companion plants

Ryegrass, cool-season annual small grains, and vetch.

### Description

A cool-season annual legume. A very popular clover for providing deer forage and foliage and insects for quail and turkey.

### Fertilization

Soil tests are recommended, or use 400 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Management

Reseeding can often be enhanced by fall disking or mowing and fertilizing at the rate of 200 pounds per acre of 0-20-20.

### Planting dates

September 1 to November 15.

### Planting rates

Requires white clover inoculant. Drill 3 pounds per acre at 1/4 of an inch, or broadcast 4 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Very well adapted to fertile, bottomland, and moist soils.

### Soil preparation

Plant in a firm seedbed. In wet areas, seeds and fertilizer can be broadcast and lightly disked in.

### Varieties

Osceola, Tillman, Regal, Louisiana S1, and California.

## White Dutch Clover

### Companion Plants

Bahiagrass, dallisgrass, ryegrass, and cool-season annual small grains.

### Description

A cool-season perennial legume. Grows well in shaded areas and can be planted on logging roads, decks, and in strips of thinned timber. Provides foliage and insects for quail and turkey and forage for deer.

### Fertilization

A soil test is recommended, or apply 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts required to bring soil pH to 6.0 to 7.0.

### Management

Reseeding can be enhanced by fall mowing and fertilization of 200 pounds per acre of 0-20-20.

### Planting dates

September 1 to November 15.

## Planting rates

Requires a white clover inoculant. Drill 4 pounds per acre at 1.4 inches, or broadcast 4 to 6 pounds per acre and cover 1/2 of an inch.

## Soil adaptation

Well adapted to fertile, bottomland, wet soils.

## Varieties

New Zealand.

## Corn

### Companion Plants

Soybeans, cowpeas, and winter legumes.

### Description

A warm-season annual; a very favored and sought-after crop for wildlife. Corn is high in carbohydrate energy.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 15-15-15 on poor sites and 200 to 250 pounds per acre of 6-12-12 on fertile sites.

### Lime requirements

Apply according to soil test, or use amounts required to bring soil pH to 6.5-7.0.

### Management

For ducks, if flooding is desired, do not plant with any winter legumes. You can plant Japanese millet and cereal grains nearby for height/diet diversity. For deer, leave standing in patches near the wood's edge. For turkey and quail, allow seeds to fall naturally or knock down by hand or with a mower. For doves, mow in strips to provide scattered seeds and clean ground.

### Planting dates

Ideally, April 1 to May 1.

### Planting rates

Plant 12 pounds per acre in 36-inch rows, no till-in with legumes, or broadcast 12 to 15 pounds per acre and cover 1 inch.

### Soil adaptation

Well-drained loam or light clay soils are best. You may choose moderately drained soils if you want flooding for ducks.

### Soil preparation

Plant in a well-prepared seedbed.

### Varieties

There are numerous varieties. Those that produce low-growing "ears" are best for wildlife.

## Cowpeas

### Companion plants

Other warm-season annual peas and browntop millet.

### Description

A warm-season annual legume. Browsed by deer and rarely eaten by doves but highly used by turkey and quail.

### Fertilization

A soil test is recommended, or use 100 pounds per acre of 0-20-20.

### Lime requirements

A soil test is recommended, or use amount required to maintain a soil pH of 5.5 to 7.0.

### Planting dates

May 1 to July 1.

### Planting rates

Plant 15 pounds per acre in 24- to 36-inch rows, or broadcast 25 pounds per acre and cover 1 inch. Inoculant required.

### Soil Adaptation

Adapted to well-drained soils, from sandy loams to heavy soils.

### Soil preparation

Plant in a firm seedbed.

### Varieties

Thorsby Cream, Tory, Wilcox, and Cat Jang.

## Dallisgrass

### Description

A long-lived perennial bunch grass; can be planted in spring and fall with other grasses and clovers. Attracts insects, provides foliage and good nesting habitat for turkeys; also good for erosion control.

### Fertilization

A soil test is recommended, or use 400 pounds per acre of 13-13-13.

### Management

Early spring and late summer mowing with one annual fertilization of 250 pounds per acre of 13-13-13 after the first mowing.

### Lime requirements

Apply according to soil test, or 12 tons per acre in absence of test.

### Planting dates

February 15 to May 15 or September 1 to October 15.

### Planting rates

Broadcast 10 pounds per acre, and cover 1/2 of an inch.

### Soil adaptation

Adapted to fertile, moist, well-drained, light- and heavy-clay-textured soils.

### Soil preparation

Plant in a well-prepared seedbed.

## Egyptian Wheat

### Description

Egyptian wheat is actually an annual sorghum that grows up to 8 feet tall. It grows in thick stands, and heads will easily fall to the ground (lodge) at maturity. Makes cover and choice seeds for quail and turkey.

### Fertilization

A soil test is recommended, or use 200 pounds per acre of 13-13-13.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.5 to 6.5.

### Planting dates

April 1 to May 15.

### Planting rates

Drill 6 pounds per acre at 1/4 of an inch, or broadcast 6 to 10 pounds per acre and cover 1/2 of an inch.

### Soil adaptation

Widely adapted to well-drained, light-textured soils.

### Soil preparation

Plant in well-disked plots. Best to plant in patches 8 to 12 feet

wide and 30 to 50 feet long. Excellent for providing cover in large fields; you can strip plant it alternately with other warm-season grasses.

## Elbon Rye

### Companion plants

Other cool-season, annual small grains, ryegrass, vetch, and clover.

### Description

An annual, cool-season, small grain (similar to wheat). Choice food of doves, ducks, quail, turkeys; browsed heavily by deer in early stages of growth. Rye grows very fast and loses its protein level early. Rye is a cold-tolerant small grain; provides forage for deer in fall and winter, if kept mowed. Rye provides nesting, bugging areas, and seed for quail and turkey; usually dies back in early summer.

### Fertilization

A soil test is recommended, or apply 200 pounds of 13-13-13 per acre.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.5 to 6.5.

### Management

Apply 200 pounds of 34-0-0 per acre in February.

### Planting dates

September 1 to November 15.

### Planting rates

Drill or broadcast 1.5 bushels or 80 pounds of seed per acre and cover 1 inch.

### Soil adaptation

Adapted to well-drained, light-textured clay soils. Does not grow well in poorly drained soils.

### Soil preparation

Plant in a well-disked seedbed.

## Grain Sorghum

### Companion plants

Browntop millet, corn, sunflower, and winter legumes.

### Description

A very hardy, warm-season annual with tall, medium, and dwarf varieties. Favorite foods of turkeys, quail, doves, and, less often, ducks.

### Fertilization

A soil test is recommended, or use 150 to 250 pounds of 13-13-13 per acre.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.6 to 6.5.

### Management Management

If you choose larger varieties, knock down with mower at maturity; often you can make second crops after pruning heads with mower.

### Planting dates

April 15 to June 15.

### Planting rates

Plant 8 pounds per acre in 24- to 36-inch rows, or broadcast 12 to 15 pounds per acre and cover 1 inch.

### Soil adaptation

Bottomland, well-drained, heavy clay to clay loam soils are best. However, moderately-drained soils are acceptable when you want flooding.

### Soil preparation

Plant in a well-disked seedbed.

### Varieties

Choose non-bird resistant, dwarf varieties such as Kafir, Hegair, Milo, and small game food sorghum.

## Lab Lab

### Companion plants

Other drought-resistant warm-season legumes; millet, corn, and sorghum.

### Description

Very drought tolerant, fast growing, erect, warm-season legume that is weakly perennial and does not readily reseed. Used widely in south Texas. Highly preferred by deer.

### Fertilization

Soil tests are recommended, or use 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0 to 7.5.

### Management

Seedlings are not competitive. Keep seedbed free of weeds, and avoid grazing or browsing for the first month after establishment. Must be reseeded each year. Inoculate before planting.

### Planting dates

April 15 to June 15.

### Planting rates

Drill 5 to 10 pounds per acre at 1/4 of an inch, or broadcast 10 to 20 pounds per acre and cover 1/2 to 3/4 of an inch.

### Soil adaptation

Grows on well-drained, sandy, upland sites. Very drought tolerant; will not tolerate wet soils.

### Soil preparation

Plant in a well prepared, firm seedbed.

## Lespedezas

**Note:** *Lespedeza* is an excellent crop for the bobwhite quail. You can plant annual lespedezas with other summer grasses, legumes, and grains. Seeds will also germinate and sprout without soil disturbances, especially on areas overseeded after prescribed burning. These are good plantings for seeding roadsides. *Sericea lespedeza* is widely planted for soil erosion and hay. However, its seeds are not palatable to quail and turkeys. You get better stands of shrub lespedeza by transplanting prepared seedlings from a nursery.

## Annual Lespedeza

### Description

Kobe and Korean lespedeza are reseeding annual legumes. Kobe grows about 6 to 10 inches high, and Korean grows about 12 to 18 inches high. Both produce seeds for quail and turkey.

### Fertilization

A soil test is recommended, or use 200 to 300 pounds of 0-20-20 per acre.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.0 to 6.5.

### Management

Reseeding can be enhanced by disking and fertilizing with 100 pounds of 0-20-20 per acre.

### Planting dates

March 1 (Kobe) to May 1 (Korean)

### Planting rates

Broadcast 10 pounds per acre, and cover 1/2 of an inch.

### Soil adaptation

Adapted to well drained soils, primarily sandy loams to clay loams.

### Soil preparation

Plant in a well-disked seedbed, or direct seed along fire lanes and roadsides.

## Shrub Lespedeza

### Description

Two types of shrub lespedeza are commonly planted in this region. Bicolor is the number-one planted lespedeza and is a sought-after plant of the bobwhite quail. Bicolor produces choice seeds for quail and turkeys and provides suitable nesting cover. Deer will also heavily browse these plants. The other is *Thunbergii*. It also provides choice seeds for quail and turkey but supposedly is more deer resistant than other lespedezas. Both of these species are perennial legumes that grow to heights of 5 to 8 feet.

### Fertilization

A soil test is recommended, or apply 400 pounds of 0-20-20 per acre in fields (depleted areas), or 250 pounds per acre in woods.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0.

### Management

Shrub lespedeza should be bushhogged and refertilized with 200 pounds of 0-20-20 per acre just before spring green-up.

### Method of establishment

Direct seeding or seedling transplants.

### Planting dates

November 15 to March 1.

### Planting rates

Broadcast 15 pounds per acre, or plant seedlings in rows 2 to 3 feet apart with 18- to 24-inch spacings between plants. A long and narrow plot 4 to 5 rows wide and at least 200 feet long (1,000 to 2,000 plants) is recommended. Plant along fence rows and at edge of woods for transition zones and through thinned

timber of fields to break up touching, single vegetative layer areas.

#### Soil adaptation

Well-drained sandy loam to clay loam sites.

#### Soil preparation

If you will seed lespedeza, plant in a well-prepared, firm seedbed. Although not necessary, disking would help hand-planting tremendously. A tractor with three-point hitch planter is essential when planting considerable numbers/plots of bush lespedeza seedlings.

#### Varieties

Bicolor Strain 101; Thunbergii Amquail and Attaway.

### Browntop Millet

#### Companion plants

Winter legumes, grain sorghum, and sunflower.

#### Description

A summer annual grass that grows up to 3 feet high and matures in 60 days. Seeds are choice foods of quail, turkeys, doves, waterfowl, and non-game birds.

#### Fertilization

A soil test is recommended, or use 300 pounds of 6-12-12 per acre. Additional use of nitrogen may cause less seed production and more grass production, which is not desirable, unless planted for hay.

#### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.5 to 7.0.

#### Planting dates

For doves, plant 80 days before the season. For ducks, plant in late July to early August and flood several weeks before desired hunting date.

#### Planting rates

Drill 8 pounds per acre at 1/4 of an inch, or broadcast 10 pounds per acre and cover 1/2 of an inch; can be planted in 2 to 3-foot rows at 8 pounds per acre.

#### Soil adaptation

Well adapted to all upland soils and well-drained bottomland soils.

#### Soil preparation

Plant in a well disked seedbed.

### Dove Proso Millet

#### Companion plants

Grows best alone.

#### Description

A warm-season annual grass that grows up to 6 feet high. Seeds mature in 80 days; choice seeds of doves, quail, and turkeys.

#### Fertilization

A soil test is recommended, or use 300 pounds of 6-12-12 per acre.

#### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 5.5 to 6.5.

#### Planting dates

May 15 to June 15.

#### Planting rates

Drill 15 pounds per acre at 1/4 of an inch, or broadcast 15 to 20 pounds per acre and cover 1/2 of an inch.

#### Soil adaptation

Adapted to well-drained fertile soils.

#### Soil preparation

Plant in a well-disked seedbed.

### Foxtail Millet

#### Companion plants

Usually outcompetes other grasses.

#### Description

A warm-season annual grass that varies in height according to variety. Seeds mature in 90 days; choice seeds of doves, quail, and turkeys.

#### Fertilization

A soil test is recommended, or apply 300 pounds per acre of 6-12-12.

#### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.5 to 6.5.

#### Planting dates

May 15 to June 1.

#### Planting rates

Drill 15 pounds per acre at 1/4 of an inch, or broadcast 15 to 20 pounds per acre and cover 1/2 of an inch.

#### Soil adaptation

Adapted to well-drained upland soils.

#### Soil preparation

Plant in a well-disked seedbed.

#### Varieties

Common, German, and Hungarian.

### Japanese Millet

#### Companion Plants

Grows best alone.

#### Description

A warm-season, annual reseeding grass that grows up to 2 to 4 feet tall. Seeds mature in 50 to 60 days. Japanese millet is the most popular planting used for ducks. This plant can withstand shallow flooding during growth. It produces choice seeds for ducks, doves, quail, and turkeys and provides forage for deer.

#### Fertilization

Apply 200 pounds per acre of 13-13-13. Fertilization is not required when direct seeding on mud flats.

#### Lime requirements

Use amounts required to maintain a soil pH of 6.0.

#### Management

Flood 2 weeks before duck season. It is prone to lay over and sprout if flooded for extended periods.

#### Planting dates

As near August 1 as possible for waterfowl.

### Planting rates

Broadcast 20 pounds per acre, and cover 1/4 of an inch.

### Soil adaptation

Grows best on wet soils.

### Soil preparation

Plant in a well-disked seedbed, or direct seed onto mud flats.

## Oats

### Companion plants

Ryegrass, clover, vetch.

### Description

A cool-season annual small grain that is a choice food of doves, ducks, quail, turkeys, and browsed by deer in early stages of growth. Oats are not as cold hardy as are wheat, barley, and rye.

### Fertilization

A soil test is recommended, or use 200 pounds per acre of 13-13-13.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.5 to 6.5.

### Management

Apply an additional 200 pounds per acre of 34-0-0 in February.

### Planting dates

September 1 to November 1.

### Planting rates

Broadcast or drill 1.5 bushels or 80 pounds of seed per acre, and cover 1 inch.

### Soil adaptation

Adapted to well-drained, light-textured soils.

### Soil preparation

Plant in a well-disked seedbed.

## Partridge Pea

### Description

A reseeding, warm-season annual legume with small fern-like leaves, yellow flowers, and short pods containing black seeds. Grows naturally along roadsides, fence rows, ditch banks, and fallow fields. Seeds are a staple of the bobwhite quail.

### Fertilization

Not required on fertile sites; infertile sites require 200 pounds per acre of 0-20-20.

### Management

Partridge pea needs to be disked in February every third year to ensure proper reseeding.

### Planting dates

February 1 to March 15.

### Planting rates

Drill or broadcast 15 pounds of scarified seed per acre.

### Soil adaptation

Grows naturally on all soils in this region.

### Soil preparation

Can be planted on closely mowed grasses and lightly disked in, or can be planted in a well-disked seedbed.

## Rape

### Companion plants

Wheat, rye, turnips.

### Description

An erect, warm-season perennial that resembles turnips. Highly preferred by deer.

### Fertilization

Soil tests are recommended, or use 50 to 75 pounds per acre of 10-10-10.

### Lime requirements

Apply according to soil tests, or use amounts necessary to maintain a soil pH of 6.5 to 7.0.

### Planting dates

August 1 to September 15.

### Planting rates

Plant 8 to 10 pounds per acre and cover 1/4 of an inch.

### Soil adaptation

Well suited for damp soils.

### Soil preparation

Plant in a firm seedbed. A good plant for no-till seed combinations.

### Varieties

Dwarf essex

## Ryegrass

### Companion plants

All cool-season small grains, clover, and vetch.

### Description

A cool-season annual grass heavily browsed by deer; provides forage and insect habitat for turkeys and quail.

### Fertilization

A soil test is recommended, or apply 250 pounds per acre of 13-13-13.

### Management

In December, apply 150 pounds per acre of 34-0-0.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0.

### Planting dates

September 1 to November 1

### Planting rates

Drill or broadcast 20 to 30 pounds of seed per acre and cover 1 inch.

### Soil adaptation

Adapted to all textured, well-drained soils, except sandy soils.

### Soil preparation

Plant in a well-disked seedbed.

### Varieties

Gulf Coast, Marshall (cold tolerant), and Jackson (rust resistant).

## Sawtooth Oak

### Description

An oak introduced from Asia that can produce mast crops of acorns in 5 to 6 years. It has long, shallow, lobed leaves like Chestnut Oak and produces acorns about 5/8 of an inch to 1 1/4 inches long. Deer, turkeys, and squirrels are attracted to these acorns. Sawtooth oak is in the white oak group.

### Fertilization

Not recommended until second year. At that time, apply 4 to 6 ounces of 15-15-15 per tree in a circular fashion around the tree.

### Lime requirements

While research is still being conducted on exact rates, a pH of 5.5 to 6.0 is desirable for other white oaks.

### Management

After the second year, continue to fertilize with 4 to 6 ounces of 13-13-13 until mast crops appear. Control weed competition by mowing or disking. Thinning is required when limbs start to touch.

### Planting date

January.

### Planting rates

Obtain 1 year old seedlings. Plant in a 10 by 8 foot spacing, with trees 8 feet apart and rows 10 feet apart.

### Soil adaptation

Adapted to fertile, well-drained sites and can withstand flooding in the dormant season. Sawtooth oaks are difficult to establish on many Southeastern sites.

### Soil preparation

Plant in an area that can be mowed.

## Soybeans

### Companion plants

Corn.

### Description

A warm-season annual legume. Provides food and cover for rabbits, turkeys, quail, doves, and ducks. Browsed heavily by deer in early stages of growth.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 0-20-20.

### Management

If planted for waterfowl, remember that non-reseeding variety seeds will spoil in 30 days after flooding. Also, waterfowl do not use the protein in soybeans efficiently, even though they readily eat them. Plant large plots in areas with high deer densities, or plots will be overgrazed quickly.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a soil pH of 5.8 to 7.0.

### Planting dates

May 1 to June 1.

### Planting rates

Plant 30 pounds per acre in 24- to 36-inch rows, or drill 30 pounds per acre at 10-inch row spacing, or broadcast 50 pounds per acre and cover 1/2 of an inch; inoculant required.

### Soil adaptation

Adapted to well-drained, medium-textured soils such as sandy loams and clay loams.

### Soil preparation

Plant in a well-disked, firm seedbed.

### Varieties

There are hundreds of varieties; reseeding varieties, such as Bobwhite and Quailhaven, are being studied at the SCS Plant Materials Center in Coffeerville. Select "forage-type" varieties for best performance.

## Sunflower

### Companion plants

Browntop millet, grain sorghum.

### Description

A warm-season annual that is a highly favored food source for mourning doves. Seeds are also used by turkeys, quail, and non-game birds. Plant the dwarf varieties where possible.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 13-13-13.

### Lime requirements

Apply according to soil test, or apply amounts necessary to maintain a soil pH of 5.5 to 6.5.

### Management

Mow several strips randomly through plot to clean the ground, and scatter the seeds; should be done at least 14 days before dove season.

### Planting dates

April 15 to June 15. If planted for doves, plant before May 15 to ensure seed maturity for dove shoots in September.

### Planting rates

Drill or broadcast 10 to 15 pounds per acre at 1/4 to 1/2 of an inch. For best results, plant 15 pounds of seed per acre in 36-inch rows.

### Soil adaptation

Best adapted to fertile, well-drained soils.

### Soil preparation

Plant in a well-disked seedbed.

## Vetch

### Companion plants

Cool-season small grains, ryegrass, clover.

### Description

A cool-season annual legume. Grows rapidly in late winter and early spring. Provides choice seeds and foliage for turkey and bobwhite quail; browsed heavily by deer.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts required to maintain a pH of 5.5 to 6.5.

### Management

To enhance reseeding, disk plot every third year in February, and apply 100 pounds per acre of 0-20-20.

### Planting dates

September 1 to November 1.

### Planting rates

Drill 20 pounds per acre at 1/4 of an inch, or broadcast 25 to 30 pounds per acre and cover 1/2 of an inch; inoculant required.

### Soil adaptation

Adapted to well-drained, medium textured soils.

### Soil preparation

Plant in a well-disked seedbed.

### Varieties

Hairy vetch, the most hardy and widely planted; smooth vetch, same as hairy, without hairs on stem; grandiflora, the best reseeded of the three and can be encouraged naturally by winter diskings.

## Joint Vetch (Deer Vetch)

### Companion plants

Warm-season perennial grasses.

### Description

A warm-season annual, reseeding legume. Provides excellent forage for deer and succulent foliage and seeds for dove, quail, and turkeys. Will grow on wet sites and can be flooded 18 to 24 inches for ducks.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 0-10-20.

### Lime requirements

Apply according to soil test, or apply amounts necessary to maintain a soil pH of 5.5 to 6.5.

### Management

You can enhance reseeding by spring disking; reapply 300 pounds per acre of 0-10-20.

### Planting dates

March 1 to June 1.

### Planting rates

Broadcast 8 to 10 pounds per acre and cover 1/2 of an inch; inoculation required.

### Soil adaptation

Adapted to moist, and wet, light textured soils. Do not plant in sandy soils.

### Soil preparation

Plant in a well-disked, firm seedbed.

## Wheat

### Companion plants

Ryegrass, clover, vetches.

### Description

A cool-season, annual small grain, widely planted; highly favored by ducks, doves, quail, and turkey as a source of seed; also, heavily browsed by deer in early stages of growth.

### Fertilization

A soil test is recommended, or use 200 pounds per acre of 13-13-13.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 5.5 to 6.5.

### Management

Apply an additional 200 pounds per acre of 34-0-0 in February.

### Planting dates

September 1 to November 1.

### Planting rates

Broadcast 80 pounds (1.5 bushels) per acre and cover 1 inch.

### Soil adaptation

Adapted to well-drained, lightly textured soils; does not grow well in poorly drained soils or heavy clays.

### Soil preparation

Plant in a well-disked seedbed.

## Wild Winter Peas

### Companion plants

Bahiagrass and dallisgrass.

### Description

A cool-season, annual reseeding legume. Grows up to 3 feet high and makes rapid growth in spring. Seeds mature in June. These peas are also known as rough winter peas, singletary peas, and caley peas. These peas are choice food of quail and turkeys and heavily used by deer.

### Fertilization

A soil test is recommended, or use 300 pounds per acre of 0-20-20.

### Lime requirements

Apply according to soil test, or use amounts necessary to maintain a soil pH of 6.0 to 7.0.

### Management

You can enhance reseeding by early fall disking and reapplication of fertilizer at the rate of 200 pounds per acre of 0-20-20.

### Planting dates

September 1 to November 15.

### Planting rate

Broadcast 30 pounds per acre, and cover 1 inch. Must use scarified seed. Vetch inoculant required.

### Soil adaptation

Better adapted to heavy clay, fertile to moderately fertile soils.

### Soil preparation

Plant in a well-disked seedbed.





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Revised by **Dr. Ben West**, Assistant Extension Professor, Wildlife & Fisheries. Originally adapted by Dean Stewart from *Wildlife Food Planting Guide for PCA Recreation Users* by David McArthur, Wildlife Manager, Tennessee Packaging. Photographs courtesy of Dean Stewart, former Extension Associate; Dr. Richard Kaminiski, Professor of Wildlife; and Dr. Harry A. Jacobson, Professor of Wildlife, Mississippi State University.

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(rev-2500-08-04)



# Wildlife Food Plot Planting Guide For the Southeast



Crop	Forage Class <sup>A</sup>	Varieties	Planting Dates	Planting Rate (lbs./acre) <sup>B</sup>			Wildlife
				Drill	Broadcast	Inoculant <sup>C</sup>	
Alyceclover	L/A		May 1 – June 15	15	20	EL	Deer
Aeschynomene (American Jointvetch, Deervetch)	L/A	Lee, Glenn	March 15 – June 15	15	20	EL	Deer-Dove-Quail
Alfalfa	L/P	Alfagraze, Amerigraze 401 & 702, Ameristand, Bulldog 505	Sept. 1 – Oct. 15	15	20	A	Deer-Quail-Turkey-Rabbit
Austrian Winter Peas	L/A	Granger, Fenn, Melrose	Sept. 1 – Nov. 1	30	40	C	Deer-Turkey
Benne or Sesame	F/A	(90- to 120-day maturity)	April 1 – June 30	5	10		Dove-Quail
Birdsfoot Trefoil	L/P	AU Dewey, Fergus (best in a mix with grasses or other legumes)	Sept. 1 – Oct. 15	6	10	K	Deer-Quail-Turkey-Rabbit
Brassicas	F/A	Available varieties of Rape, Kale, Turnip, Canola	Sept. 1 – Oct. 15	5	10		Deer-Rabbit-Turkey
Buckwheat	F/A	Japanese, Silverhull, CommonGray, Mancan, Manor, Royal, Tokyo	May 1 – June 1	40	60		Deer-Dove-Duck-Quail-Turkey
Burnett, Small	F/P	Delar	March 1 – May 1	5	10		Deer-Quail
Chicory	F/P	Choice, Puna, Puna II, Brow Tyne, Six Point, Oasis	Sept. 1 – Oct. 15	2	4		Deer-Rabbit-Turkey
Chufa	G/A	Turkey Gold, Wingmaster	April 1 – June 1	25	40		Deer-Turkey-Duck
Clover, Arrowleaf	L/A	Meeche, Yuchi, Amclo, Apache	Sept. 1 – Oct. 15	10	15	O	Deer-Turkey-Rabbit
Clover, Ball	L/A		Sept. 1 – Oct. 15	2	3	B	Deer-Turkey
Clover, Berseem	L/A	Bigbee, Tibbee	Sept. 1 – Oct. 1	10	20	R	Deer-Turkey
Clover, Crimson	L/A	Chief, Autauga, Dixie, Tibbee, Auburn, Talladega	Sept. 1 – Oct. 15	20	30	R	Deer-Turkey-Rabbit
Clover, Ladino (White) <sup>D</sup>	L/P	Osceola, Regal, Louisiana-S1, Patriot, Durana, Regalgraze	Sept. 1 – Oct. 15	4	5	B	Deer-Quail-Turkey-Rabbit
Clover, Red	L/P	Kenland, Redland Max, Redland Graze, Redland III, Bulldog, Kenstar	Sept. 1 – Oct. 15	8	12	B	Deer-Quail-Turkey-Rabbit
Clover, Subterranean	L/A	Woogenellup, Mt. Barker, Daliak, Clare, Nuba, Nungarin	Aug. 15 – Oct. 15	15	20	WR	Deer-Quail-Turkey-Rabbit
Corn <sup>E</sup>	G/A	Commercial varieties Dwarf Tropical	March 15 – June 1	12	15		Deer-Dove-Duck-Quail-Turkey
Cowpeas	L/A	Iron Clay, Red Ripper, Combine	May 1 – July 1	15	45	EL	Deer-Quail-Turkey
Egyptian Wheat	G/A		April 1 – June 1	5	15		Dove-Quail-Turkey
Grain Sorghum <sup>E</sup>	G/A	Kafir, Hegair, Dwarf Milo, Commercial varieties (90-to 115-day maturity, depending on variety)	April 15 – June 15	10	15		Dove-Duck-Quail-Turkey
Lab Lab	L/A	Rongai, Highworth, Rio Verde	April 1 – June 1	5	10	EL	Deer-Rabbit
Lespedeza, Annual	L/A	Common, Kobe, Korean	March 1 – April 1	20	30	EL	Quail-Turkey
Lespedeza, Shrub <sup>F</sup>	L/P	Amquail Thunbergii, Attaway, Bicolor 101	March 1 – April 1	6	12	EL	Quail
Millet, Browntop	G/A	Commercial varieties (60- to 65-day maturity)	May 1 – August 1	15	25		Dove-Duck-Quail-Turkey
Millet, Proso	G/A	Dove Proso, White Proso (75-day maturity)	May 1 – June 30	15	30		Dove-Duck-Quail-Turkey
Millet, Foxtail	G/A	Common, German, Hungarian (90-day maturity)	May 1 – July 1	15	25		Dove-Quail-Turkey
Millet, Japanese	G/A	Common, Chiwapa, Golden Millet (80- to 120-day maturity, depending on variety)	May 1 – August 1	12	25		Dove-Duck-Quail-Turkey
Oats	G/A	Arkansas 604 & 833, Buck Forage, Buck Magnet Chapman, Coker, Dallas, Florida 501, Harrison Horizon 314, Rogers, TAM 606	Aug. 15 – Oct. 15	90	120		Deer-Dove-Quail-Turkey-Rabbit
Partridge Peas	L/A	Lark Selection, Showy, Commanche	Feb. 1 – May 1	6	10	EL	Quail
Rye	G/A	Elbon, Wrens Abruzzi, Wondergraze, Vitagraze Wintergrazer 70, Maton, Bates	Aug. 15 – Oct. 15	90	120		Deer-Dove-Quail-Turkey
Ryegrass <sup>G</sup>	G/A	Commercial varieties, Gulf, Tetraploid, Marshall Passerel Plus	Sept. 1 – Nov. 1	20	30		Deer-Quail-Turkey-Rabbit
Soybeans <sup>E</sup>	L/A	Commercial varieties, Tyrone, Hutchinson	April 15 – June 1	30	60	S	Deer-Dove-Duck-Quail-Turkey
Soybeans, Wildlife	L/A	Quail Haven, Laredo	April 15 – June 15	10	25	S	Deer-Quail-Turkey-Rabbit
Sunflower <sup>E</sup>	F/A	Commercial Black Oil Hybrids, Peredovick (120-day maturity)	April 1 – May 15	4	15		Dove
Triticale	G/A	Tamcale 5019, Beagle 82, Trical 102 & 336	Aug. 15 – Oct. 15	90	120		Deer-Turkey
Vetch	L/A	Bigflower; Hairy-Madison, Auburn, Americus, Oregon, Lana; Common-AU Olympic, Willamette	Sept. 1 – Oct. 15	20	30	C	Deer-Dove-Quail-Turkey-Rabbit
Wheat	G/A	Commercial forage varieties, Longhorn, Lockett, GA Gore, Saluda	Aug. 15 – Oct. 15	90	120		Deer-Dove-Quail-Turkey-Rabbit

The information given here is for educational purposes only. References to commercial products or trade names are made with the understanding that no discrimination is intended against other products that may also be suitable.

<sup>A</sup> Forage classes: A = Annual; F = Forb; G = Grass; L = Legume; P = Perennial

<sup>B</sup> All of the above planting rates assume a complete stand for each species. If you plan to mix species, reduce planting rates (such as when broadcasting a 50/50 mixture of wheat and oats, use 60 lbs of each for a total of 120 lbs)

<sup>C</sup> Purchase either preinoculated legume seed or inoculate with the appropriate inoculant before planting.

<sup>D</sup> This seeding rate is based on preinoculated seed coated with clay/lime. Use 2 (drill) or 3 (broadcast) pounds of uncoated seed.

<sup>E</sup> Broadcasting seed is not recommended for these plantings. Drilling seed in rows improves forage and seed production.

<sup>F</sup> Potentially invasive non-native species; may require mechanical and herbicidal control in some situations.

<sup>G</sup> Potentially invasive non-native species; may require mechanical and herbicidal control in some situations. Most appropriate for shady, acidic, or wet sites where other forages perform poorly.

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By Dr. Bronson Strickland, Assistant Extension Professor, Wildlife & Fisheries; Richard Taylor, Mississippi Seedsmen's Association; Kevin Nelms, USDA Natural Resources Conservation Service; and John Gruchy, Mississippi Department of Wildlife, Fisheries & Parks.

Soil sample boxes can be picked up at your county MSU Extension Service office. It is important that all information asked for on the container, as well as any additional paperwork, be filled out completely and accurately. Crop code 95 should be used for any wildlife seed mixtures (clover, alfalfa, ryegrass, chufa, etc.).

For more information, forms, sample boxes, sampling publications, packaging, and instructions, contact your local county Extension Office or MSU-ES Soil Testing Laboratory. The cost is \$6.00 per soil sample.

Samples may be sent directly to the MSU-ES Soil Testing laboratory at the address below or may be returned to you local MSU-ES office. Be sure to include the information sheet and check or money order with the package. Label and tightly secure the shipping container.

**MAIL PACKAGES TO:**  
MSU-ES Soil Testing Laboratory  
Box 9610  
Mississippi State, MS 39762-9610

Mississippi State University Extension Service Soil Testing Laboratory is committed to meeting the needs of its clientele with an accurate and timely report of soil or plant sample for optimum production.



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(4M-3-05)

Soil tests for food plots

# soil tests for WILDLIFE FOOD PLOTS



IF YOU ARE INTERESTED IN *enhancing*

*wildlife* ON YOUR PROPERTY-

## *bigger deer, more quail, larger turkeys-*

THEN YOU MUST UNDERSTAND THE

SIGNIFICANCE OF SOILS. SOIL FERTILITY AND

TYPE INFLUENCES MANY ASPECTS OF

WILDLIFE, INCLUDING POPULATION

DISTRIBUTION, ABUNDANCE, and QUALITY.

FOR EXAMPLE, RESEARCH HAS SHOWN THAT

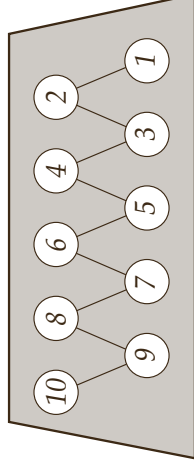
ANTLER SIZE IN WHITE-TAILED DEER IS

DIRECTLY AFFECTED BY SOIL FERTILITY.



The establishment of food plots is one management technique that more and more landowners are using to benefit wildlife. If you are interested in establishing food plots for wildlife, a soil test is necessary for success. A soil test will provide recommendations for lime and fertilizer, customized to your site and for the plants in which you are interested. The MSU-Extension Service soil testing laboratory runs a variety of tests on soil samples including: pH, buffer pH (lime requirement), phosphorus, potassium, calcium, magnesium, sodium, and zinc. Based on these tests, your report will recommend levels of nitrogen, phosphorus, and potassium needed for your specific situation. In addition, a soil test will provide you with lime recommendations to balance acidic soils, which are common in Mississippi. However, because some soils within the state are alkaline and do not require lime, a soil test is always recommended to determine the requirements for your site. Lime can improve the physical, chemical, and biological conditions in acidic soils, resulting in greater root proliferation, earlier aboveground plant growth, and improved nutrient and water uptake. Without proper liming, fertilization can be a wasted effort and expense (see table).

Proper collection of soil samples is extremely important to ensure reliable recommendations. To properly collect a soil sample, take several sub-samples from throughout the field and mix them together to obtain an average for the entire area. The number of sub-samples needed is dependent on the size of the field; as a rule of thumb, take about 10 sub-samples for every acre in the field. Thus, if you planned to establish a 1-acre wildlife food plot, plan on taking 10 sub-samples that you would combine into a single sample for that field. Sub-samples should be collected from the top layer of soil, which is 0-6 inches in depth. Mix the sub-samples together to form a uniform sample and discard any plant material that could have been collected.



SOIL ACIDITY	NITROGEN	PHOSPHATE	POTASH	FERTILIZER WASTED
Extremely Acid 4.5 pH	30%	23%	33%	71.34%
Very Strong Acid 5.0 pH	53%	34%	52%	53.67%
Strongly Acid 5.5 pH	77%	48%	77%	32.69%
Medium Acid 6.0 pH	89%	52%	100%	19.67%
Neutral 7.0 pH	100%	100%	100%	0.00%

SOURCE: *Practical Fertilizer Use*, 4th edition, IMC Fertilizer, Inc.

