

Bluff Hills— Ideal For Hardwood Timber Production

Meandering along the eastern edge of the Mississippi River Valley from Cairo, Illinois, to Baton Rouge, Louisiana, are 4½ million acres of forested uplands variously called the Loess Hills, the Thick Loess area, the Brown Loam Bluffs, the Bluff Hills, or just the Bluffs. The area (Fig. 1) is well known to foresters and lumbermen who work in the Lower Mississippi Valley, for it is potentially one of the most productive hardwood sites in the nation.

In the moist bottoms of this region cottonwoods grow to be 30 inches in diameter in 30 years, and have five logs. The slopes produce 30-inch sassafras trees with three clear logs. Diameter growth of cherry-bark oak exceeds ½ inch per year on many sites. Excellent specimens of basswood, black cherry, and yellow poplar grow here also, and toward the north, black walnut.

Not only does hardwood timber in the Bluffs grow at the rate of 400 to 500 board feet per acre per year, but it also is generally free of insect damage to the main stem. This is a distinct advantage over the adjacent Mississippi Delta area, where trees of some species are degraded by heavy borer attacks.

The Bluff Hills and Their Forests

The Bluff Hills had a unique beginning: they just blew in. It is a generally accepted theory that the hills were formed from silt borne by the wind—called loess. The loess was deposited at three different periods and in varying thicknesses from the southern to the northern extremes of the Bluff area. It is believed that the rich soils in the alluvial plain of the Mississippi River were the most important source of loess and that the prevailing westerlies were the main loess-depositing winds. Eventually, the wind-blown hills covered a zone 5 to 25 miles wide and rose 100 to 600 feet above sea level.

At present, the rich loess soil is deepest (up to 100 feet) near the western edge of the Bluffs. It thins out to the east, giving way to the clay and sands common to the uplands of Mississippi and Tennessee. The soils are low in organic matter and very erosive. Thus, the area is

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deeply gullied and has many narrow ridges.

A number of streams and rivers cut through the hills from the east, the most notable being the Obion, Forked Deer, Hatchie, Loosahatchie, Wolf, Coldwater, Tallahatchie, Yocoma, Yalobusha, Bib Black, and Homochitto. In the wider branches, leading into the Mississippi alluvial valley or into major streams or rivers, are some relatively wide bottoms. Many of these are farmed. The gentle slopes and the broader flat lands along some streams are often pastured.

In pre-Civil War days the ridges and bottoms in the Bluffs were cleared for farming from Natchez to east of Vicksburg. Only slopes too steep for cultivation remained in timber some 100 years ago. One might find this hard to believe when touring the Bluff Hills today, for trees have reoccupied many of the old fields.

More than 50 tree species are found in Bluff forests. Most of these are hardwood. Some pine, chiefly loblolly with a little shortleaf, also occurs, especially in the southern portions. The branches, smaller streams, and outwashes into the main alluvial valley afford the best hardwood sites, but the slopes also produce high-quality hardwoods rapidly. The highest ridges and the thinnest loess soils are best adapted to pine.

While the Bluff forest lands are outstanding in their ability to grow quality hardwoods, they resemble most other forest lands in at least one way. That is, there is a large gap between their potential and their performance. In many stands the best trees have been cut, often before their prime and usually without regard to the necessity of leaving seed trees of desirable species. Cattle, hogs, and goats have roamed many of the forests at will, browsing and eating seedlings and seed of the best species. The potential of some forests has been disguised by

fires that have eliminated nearly all tree reproduction and either killed the large trees or opened them to butt rot.

Timber Management In The Bluffs

Controlling damage from such sources is the first step toward forest management. Once his trees are under protection, though, the landowner will have to make some decisions. What trees should he manage for? How can he encourage desirable trees to develop?

Preferred species.—In the light of present knowledge, cherry-bark oak and Shumard oak should be among the favored species on all sites. In addition, yellow poplar, white ash, cottonwood, and black walnut will do well in coves and bottoms, and ash and yellow poplar should be encouraged on the lower and middle slopes. Management of the upper slopes should include white oak, while on the very top of eroded ridges pine excels.

In addition to the species just mentioned, a number of others will do well, among them basswood, sweet gum, chinkapin oak, American elm, black gum, cucumber-tree, sassafras, sycamore, and Southern red oak. Trees like hickory and American beech are borderline—hickory has a limited market and beech grows slowly and usually is of poor quality. Blue beech and ironwood are pretty much weeds, salable only if a pulpwood market exists.

Cull and weed tree elimination.—Weed trees, together with badly deformed or damaged trees of better species, are taking up an undue amount of growing space in most Bluff forests. As quickly as he can, the land-owner should deaden such unsalable culls, and get better trees in their place.

A 1 to 20 mixture of low-volatile ester of 2, 4, 5-T in diesel fuel will kill unwanted trees. The chemical is usually applied in a frill—a girdle made by encircling the tree with overlapping, downward ax cuts. The frill must be complete, for skips will enable the tree to survive. Culls are most easily killed in the spring; they are most resistant in the fall.

Deadening the big culls is not diffi-

cult and will open a considerable amount of growing space. However, small weeds like blue beech and ironwood may get the jump on better trees when large culls are deadened. They also tend to form thickets in old openings. Those over five inches in diameter should be frilled and dosed with a 1 to 10 mixture of 2, 4, 5-T in diesel fuel. The chemical is absolutely necessary, as without it the trees will sprout to form a denser stand than before.

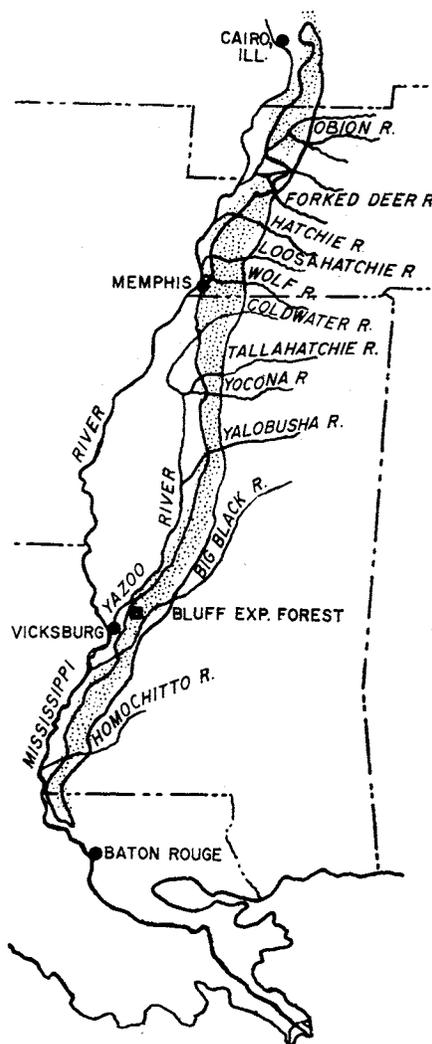
Regeneration.—Openings made by the removal of culls and weeds must be filled with desirable trees. The land-owner can secure such restocking in three ways: by encouraging natural seeding, by taking advantage of sprouts that may develop from the roots or stumps of acceptable tree species, or by planting seedlings grown in the nursery. As nature does most of the work in the first two methods, they are the most economical, though not always the quickest.

The establishment of natural seedlings can probably be aided by disking or otherwise preparing the site. It is known, for example, that some species, such as yellow poplar, prefer or require bare mineral soil. Regeneration by sprouts is not well understood, but many good trees in Bluff forests are of sprout origin.

Planting is recommended to speed up regeneration of old fields, bare ridge tops, and large openings in the woods. The species selected for planting must be suited to the site. Eastern cottonwood is a good choice for moist, open stream bottoms. Planting stock can be 20-inch cuttings from cottonwoods less than three years old. The cuttings are set 15 inches deep; they must be cultivated for a year or two, until they have outgrown competing plants. Yellow poplar may do well on low but well-drained moist sites; seedlings can usually be obtained from state nurseries. Both species need some assistance in their first years. Ridge tops are normally too dry for hardwoods, but loblolly pine can be planted with good success.

Harvesting timber.—The purpose of managing a forest is to make money by selling trees. How soon a sale can be made will depend on the condition of the stand.

Present Bluff forests generally contain trees of all ages and sizes. Until the stands are put into good silvicultural condition, harvests should be made by selecting individual trees that are over-crowded, over-mature, damaged, or of poor form or low quality—that is, trees that the land-owner wishes to replace with younger, better trees.



Dotted area represents the Bluff Hills.

At present, loggers cannot profitably cut much less than 800 board feet per acre. Many tracts do not have this much volume in damaged or undesirable trees, and selling fast-growing prime trees is trading tomorrow's dollars for today's pennies. Some owners, though, may have enough trees for an early improvement cutting. If they think so, they would do well to consult a forester to help them mark the trees to be harvested. One of the things to avoid is opening up the stand so much that the remaining trees whisker out with epicormic branches.

When Bluff forests are logged, it is important to avoid making too many logging roads and skid trails on the slopes and along the drainages in the bottoms. The soils erode so easily that one or two heavy rains can turn a skid trail into a gully. A tractor with a power winch is almost a necessity—the winch avoids the need for skidding on slopes and also simplifies the task of removing logs from coves and bottoms.

The predominant species of the Bluff forests are not in demand for

pulpwood, at present. Most of the mills do not use the plentiful oaks and hickory, although sweet gum and cottonwood have a steady market.

Even when markets are available, the rough terrain and the desirability of selective cutting limit the use of profit-making heavy equipment. Clear-cutting operations are rarely advisable from the standpoint of long-term forest management. With mules and cheap labor, a land-owner might make selective pulpwood cutting pay off, but the most important advantage would be from improving the woods and creating openings for seedlings of desirable species.

Dogwood, a common under-story species, is valuable for shuttle blocks if of good form and quality. It should be favored as part of the forest crop whenever possible. It becomes established without too much prompting by the forest manager, is easy to harvest, and is worth cutting piecemeal.

Research In The Bluff Hills

With quality hardwood trees fast disappearing, it is imperative that the excellent Bluff sites be used for maximum timber production.

To initiate intensive research into management methods, the Southern Forest Experiment Station of the U. S. Forest Service established an experimental forest in the Bluff Hills in 1956. The tract, provided by the Anderson-Tully Company and called the Bluff Experimental Forest, lies 19 miles northeast of Vicksburg in Warren County, Mississippi. It is managed by the Delta Research Center, which is maintained at Stoneville, Mississippi, by the Southern Forest Experimental Station in cooperation with the Mississippi Agricultural Experiment Station and the Southern Hardwood Forest Research Group.

Studies have already been started to provide detailed information on the topics discussed earlier in this article. A soil survey of the forest has been completed, and will aid in the establishment of future studies. Those planned will seek to formulate recommendations for planting trees, removing culls, securing natural regeneration, improving utilization, and making harvest cuts.

The potential of the Bluff forests is almost unlimited. Realizing this potential will require sound forestry techniques based on intensive research.