Four years after treatment, area on opposite page looked like this

Except for certain areas, the chances are good that nature can do much of the planting job for us — and especially where there are seed-bearing loblolly pines. Here experts describe how this natural process can be helped along

Let Nature Plant Her Share

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Since World War II, tree planting on private land has increased to a point where demand for seedlings exceeds the supply in most locations. By 1958 about a billion and a half nursery-grown seedlings will be available for planting. This comes to nearly 40 trees for every man, woman and child in the South.

Even so, there may not be enough to satisfy the flood of orders facing our southern nurseries. Consequently, it is more important than ever to plant nursery-grown seedlings in areas which cannot be reforested any other way.

Elsewhere it is quite likely that nature can do much of the planting job for us, especially in areas containing seed-bearing loblolly pines. In comparatively brush-free areas containing at least eight 14-inch (d.b.h.) or larger cone-bearing trees per acre, only an occasional poor seed year or drought could hold back regeneration—and then only temporarily.

Complications arise mainly where seed trees are few, in brushy locations, or where both conditions exist. Since a seed on bare soil is worth at least four in the brush, the solution is to develop more mineral soil surface and reduce the brush on problem areas. This requires supplemental seedbed preparation, which can be done by hand, machine, chemicals or fire depending on a specific area's need. Regardless of method used, it should be done before seedfall lest the treatment destroy or bury the seed. For loblolly pine, best results are obtained from treatments before mid-October.

The effectiveness of several possible site preparation methods is illustrated by some large-scale tests made in recent years by the Santee Research Center in South Carolina. In this case the problem was a mature stand (6,500 board feet per acre) of loblolly pine located on the Francis Marion National Forest. The 65-year-old trees, ready for harvest, occupied the brushiest site to be found in a locality noted for heavy understories. Logging which had removed about half the stand 10 years previously and complete exclusion of forest fires for a longer period were the main reasons for the vigor and aggressiveness of this brush. In the best judgment of foresters concerned, there was little chance for pine to recapture the site without special measures.

Accordingly, four site preparation techniques were applied, each on adjacent 6-acre blocks as follows:

Prescribed winter fire, summer foliage spray.—In early March 1949, one year before logging, this block was prescribed burned. About one-third of the area, mostly water-filled depressions and areas of flat hardwood fuels, did not burn. Five months later, August 1949, the foliage on all ensuing sprout growth was sprayed with a mixture of 1¼ gallons of 2, 4-D and 2, 4, 5-T in 100 gallons of water. The chemical concentrate can be obtained in a commercial formulation that contains two parts of 2, 4-D and one part 2, 4, 5-T totalling two pounds acid equivalent per gallon.

Prescribed summer fire.—This block was burned September 1949, six months before logging. Here again the fire did not burn on about one-third of the area, where flat hardwood fuels predominated.

Scarified by disk harrow.—In August 1949, seven months ahead of logging, this block was scarified with a weighted harrow drawn by a TD-9 tractor. An oak stump chained behind the harrow helped to tear up the root mat. About 85 percent of the ground area was scarified and most brush and hardwood under four inches in diameter was uprooted, knocked down, or thoroughly skinned.

Check block.—This block had no treatment in advance of logging.

About 10 months after logging, hardwoods over two inches in diameter on all four blocks were treated with a mixture of two parts of 2, 4, 5-T (4 pounds acid equivalent per gallon) to 100 parts of water, applied in frills at a convenient chopping height.

Crawler tractors, which yarded to a sawmill just off the tract, finished the logging job in March 1950. Four seed trees per acre were left. However, it was found later that the seedfall prior to logging was ample. Consequently, the seed trees became just "insurance" trees against possible seedling losses from fires.

Four growing seasons later, the results spoke for themselves (Table 1). In terms of free-growing seedlings (those not overtopped by brush or other trees) an abundance of uniformly distributed seedlings marked the three blocks whose seedbeds were prepared before logging. Although the disked area was a standout, the prescribed burned areas, including the one with supplemental chemical foliage spray, were stocked with many more trees than obtainable with a conventional hand-planting job. The remaining block had 600 seedlings per acre, but these were very poorly distributed—too dense in some spots and too scattered in others. Thus, the number of seedlings seems adequate, but the future timber stand will be irregular and understocked.

Table 1

Number of loblolly pine seedlings two or more years old and free to grow four years after specified seedbed preparation treatment

Treatment	*Seedlings per acre*	*Cost per acre*
	(Number)	*(Dollars)*
Disk-harrowed	2,800	$10.88
Prescribed summer fire	1,600	3.51
Prescribed winter fire, summer foliage spray	1,350	17.98
Chemical treatment of larger hardwoods	600	2.87

To plant areas like these requires 700 to 1,000 nursery grown seedlings. Assuming a mortality of only 30 percent in four years, survivors would number 500 to 700 per acre. Unfortunately, very few would be free to grow on account of the aforementioned brush. This difficulty adds up to a need for supplemental treatment. Releasing each overtopped seedling by hand could be very expensive. The alternative is site preparation in advance of planting, and this brings up the need for applying the same methods we use to get natural regeneration; so why plant at all in seed-producing areas?

Next comes the meat of the coconut —cost of seedbed preparation (Table 1). The reported values reflect actual on-site costs exclusive of transportation and supervision. Although the areas were treated almost eight years ago, present day labor and equipment costs have been assigned. A cost of $2.87 per acre is included in the total for each area to cover chemical treatment of larger hardwoods, which all received. Even though the range of total costs was wide—$2.87 to $17.98 per acre—no treatment cost was prohibitive. Moreover, the best results were obtained at nominal costs, $3.51 and $10.88 per acre, respectively, for the prescribed summer fire or disk-harrow scarification.

Landowners and forest managers planning for natural regeneration should choose the technique best adapted to their local conditions. Prescribed burning is not in general use outside of the Coastal Plain because its effect on soil and water runoff in areas like the Piedmont have not been determined. Such areas may benefit from machine or chemical methods similar to those described herein. A wider choice of methods is available for Coastal Plain conditions. Under actual field conditions there, a combination of measures may be best. As suggested by the Santee Research Center's large-scale tests, a logical combination appears to be prescribed fire and disk harrowing prior to seedfall and logging. Prescribed fire would be the main treatment because of its low cost and effective results. Only those areas missed by the fire would require disking.

Regardless of location the landowner should have the help of a forester to prescribe and apply the proper site-preparation techniques. Those lacking equipment can often get the job done by contract. For example, in Tidewater Virginia about 7,000 acres of site preparation have been done by contractors for private owners in recent years. And in certain states, ACP benefit payments can help defray costs. In the meantime, let's put our nursery-grown seedlings in areas that cannot be reforested any other way.

Before logging, this 65-year-old loblolly pine stand had a uniform cover of understory hardwoods and shrubs dense enough to prevent re-establishment of pine without seedbed treatment — which it received. Below is part of area scarified with tractor-drawn disk harrow dragging a stump. See photograph on opposite page for results 4 years later