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The economics of public assistance for private nonindustrial timber sales in Mississippi

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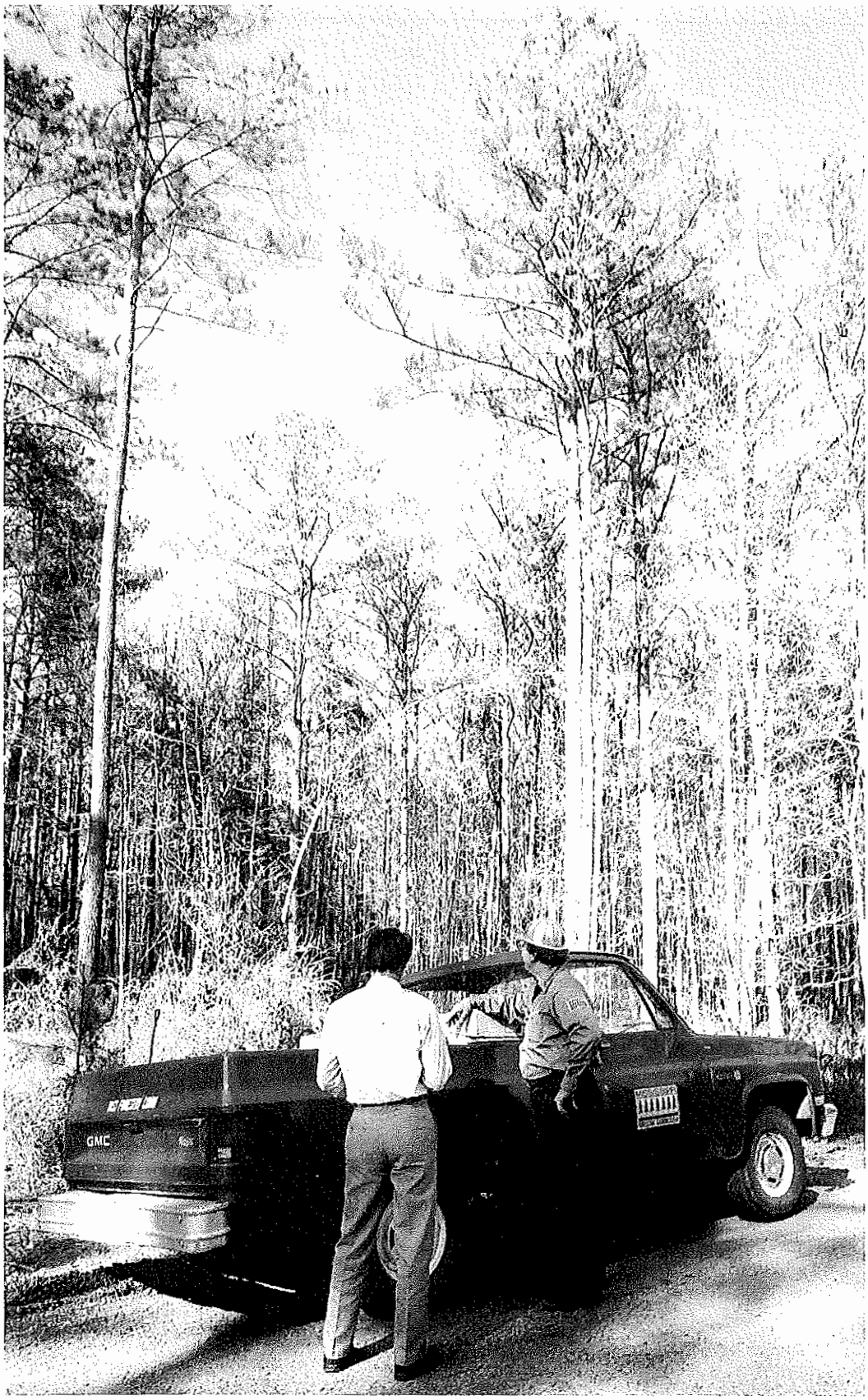


Mississippi's future as a timber producing state relies on the forestry perceptions and decisions of thousands of private landowners.

The Economics of Public Assistance for Nonindustrial Private Timber Sales in Mississippi

Introduction and Study Objectives

The U.S. South has many forestry advantages, yet public and private efforts are increasingly needed to encourage reforestation and active forest management in the region. The review draft of "The South's Fourth Forest, Alternatives for the Future" (USDA Forest Service 1987a) highlights the urgent need for increased efforts to ensure future timber availability:

. . .projections of resource change mean that the South is facing a future of rising stumpage and roundwood product prices, much lower rates of growth in timber harvests, and declines in employment in the forest industries" (p. xxxv).

The report also highlights great opportunities to increase forest productivity in the South, and to sustain continued growth in forestry employment and income—growth that will not occur without continued public assistance directed to the present and future forestry needs in the region.

Public assistance for forestry includes fire protection, research and information transfer, reforestation incentives, and other direct and indirect programs to assist public and private timber producers and wood products manufacturers and consumers. Forestry assistance programs are funded by local, state, and federal agencies. In recent years, continued funding for some programs has been questioned.

Several recent studies have compared the costs and benefits of various types of public forestry assistance. This report summarizes a study to assess the value of public assistance for private nonindustrial timber sales in Mississippi. Timber sale assistance in Mississippi was chosen for evaluation for several reasons:

- Mississippi is an important timber producing state. It is very representative of forestry conditions in the South, and is important to the region's future in timber production and processing.
- As with other states in the South, most timberland in Mississippi is owned by private individuals. Future timber production relies on their forestry perceptions and decisions.
- When private iudividuals sell timber, their perceptions of forestry are directly influenced. Reforestation decisions depend on their knowledge of options and how they perceive the economic and environmental consequences of forestry.

Timber sale assistance involves contacts between landowners and professional foresters—contacts that are certain to influence landowners' forestry decisions and future timber production. This study addressed "How much influence does timber sale assistance have on the physical and financial

Timber sales directly impact landowners' attitudes about the economic and environmental consequences of actively managing and reforesting their lands.

results of timber harvests?" and "Is timber sale assistance an efficient use of public dollars?"

Study objectives were therefore: **(1) to determine physical differences**, if any, in forest management practices on tracts harvested with the assistance of state-employed foresters and those barvested without direct forestry assistance; **(2) to compare financial returns** to landowners who received technical assistance in selling timber to those without assistance; and **(3) to estimate the social benefits and costs** of providing public assistance for nonindustrial private timber sales in Mississippi.

Methods

Several types of timber sale assistance are available to Mississippi landowners. Private forestry consultants are active in the state and provide a complete range of forest managemeut and marketing services. Timber sale assistance from public agencies is much more limited; it includes timber marketing and price information that is developed and disseminated by research and extension agencies, as well as information and direct technical assistance from the Mississippi Forestry Commission (MFC). In 1986, MFC personnel provided timber sale assistance that influenced nearly 9 million cubic feet of timber harvested on public and private lands in Mississippi (USDA Forest Service 1987b).

MFC county foresters provide two kinds of timber sale assistance: (1) They will mark timber for sale for a fee, if the landowner has been made aware of private forestry consultauts, but does not want to use or cannot obtain their service. (2) They provide general recommendations and information on timber sales—including when and if a sale is needed, alternatives for marking timber, and sample sale contracts with information on timber buyers and how to obtain bids. MFC personnel are also authorized to help assure that timber sales prepared by the Commission are being cut as marked.Prior to 1986, fees were not charged for marking timber on up to 40 acres per year.

Study objectives were accomplished by comparing data on timber sales that received MFC assistance with timber sales where no direct assistance was received from a forester. Forty timber sales were evaluated from the upper and lower coastal plains of Mississippi (Pettry 1977). As shown in Figure 1, the sales were paired (assisted and unassisted); they were selected from the coastal plains to avoid complications from different site and species conditions in the Delta, prairie, and flatwoods areas of the state.

Study methods were similar to the methods used in an economic evaluation of the Georgia Rural Forestry Assistance Program (Cubbage *et al.* 1985). Timber sales compared were geographically dispersed, and primarily included natural stands of pine and pine-hardwood that were completely or partially harvested during fiscal years 1983-1985. Nonindustrial private forest (NIPF) landowners whose timber harvests involved MFC foresters were selected at random from Commission cases that met the above criteria. Landowners who sold timber without direct assistance from a forester were identified from timber deeds filed at county chancery clerk offices, and by asking foresters and residents near assisted sales for locations of other recent timber harvests in the area.

For each pair of timber harvests, site, stand, and landowner information was collected. Stand information was collected as suggested by Cubbage (1985), allowing estimates of volumes removed by product types, and estimates of pine regeneration and future stand production. Volumes removed were estimated from stump measurements (Bylin 1982a, 1982b) on 0.1-acre fixed-radius plots. Regeneration was counted on 0.01-acre fixed-radius plots. The number of plots varied with tract size; plots were located in advance on aerial photographs. Timber volume harvested on the unassisted tract in Walthall County could not be estimated because of dense brush on the site. Therefore, certain volume comparisons were limited to 19 timber sale pairs. Regeneration and landowner

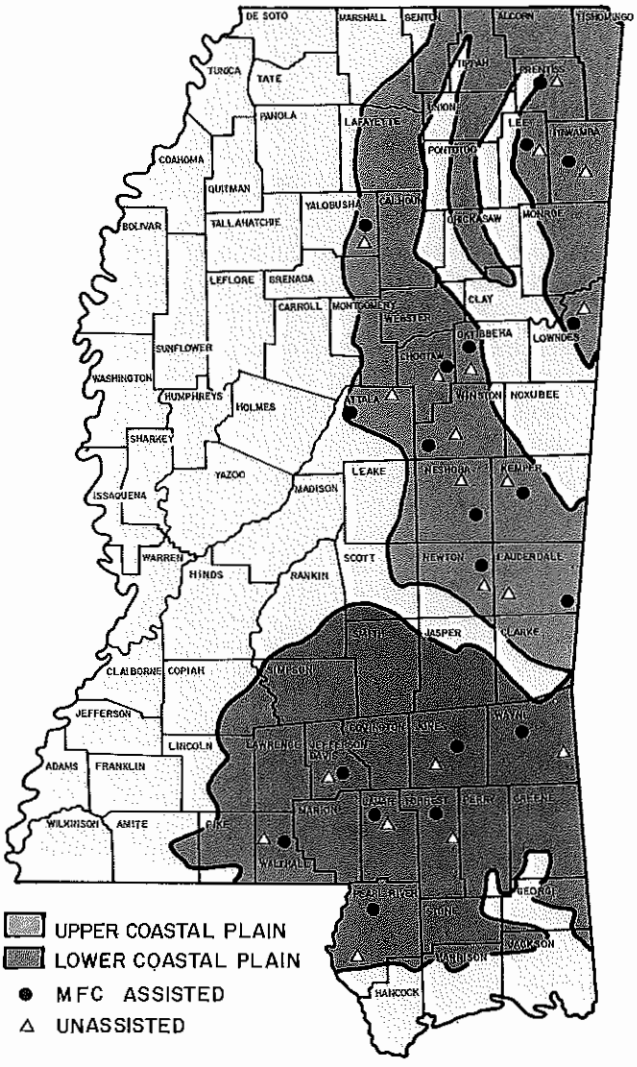


Figure 1. Forty timber sales were selected from the state's upper and lower coastal plaius.

information was collected for all timber sales, with the landowner information obtained by personal interviews.

Results

Study objectives were to estimate the **physical** and **financial** results of public assistance for nonindustrial private timber sales in Mississippi, and to evaluate the **social benefits and costs** of providing such assistance. The following sections correspond to the three objectives.

Physical Results

Initial site and stand conditions were similar. The physical results of a timber sale depend on stand conditions before harvest, and on the type and intensity of cutting performed. Before harvest, the stands involved in the present study were generally similar. The initial volumes in Table 1 were estimated by adding residual and harvest volume estimates; initial volumes per acre were statistically different only in the total pine component. MFC-assisted tracts had

Table 1. Initial, harvested, and residual volumes of pine and hardwood pulpwood and sawtimber (assisted versus unassisted).

	Mean volume (cubic feet per acre)		Difference of means	Computed t-statistic[1]
	Assisted	Unassisted		
		INITIAL VOLUMES		
Pine				
Pulpwood	125	82	43	1.8038
Sawtimber	1,365	841	524	2.0658
Total	1,490	923	567	2.1695*
Hardwood				
Pulpwood	156	229	-73	-1.3832
Sawtimber	225	266	-41	-0.4663
Total	381	495	-114	-0.9024
TOTAL	1,871	1,418	453	1.7469
		HARVESTED VOLUMES		
Pine				
Pulpwood	54	47	7	0.3877
Sawtimber	626	681	-55	-0.2891
Total	680	728	-48	-0.2478
Hardwood				
Pulpwood	83	123	-40	-0.8552
Sawtimber	127	174	-47	-0.6459
Total	210	297	-87	-0.7656
TOTAL	890	1,025	-135	-0.7801
		RESIDUAL VOLUMES		
Pine				
Pulpwood	71	35	36	2.0652
Sawtimber	738	160	578	3.0482*
Total	810	195	615	3.0818*
Hardwood				
Pulpwood	73	106	-33	-1.3527
Sawtimber	98	92	6	0.1052
Total	171	198	-27	-0.3510
TOTAL	981	393	588	2.3654*

[1]t-test statistic, as presented by Freese (1974).

* Indicates statistically significant differences (df = 18, $\alpha = 0.05$). Column totals may not add dne to rounding.

Table 2. Characteristics of timber sales and landowners with MFC-assistance and without direct forestry assistance.

Characteristic	Number of Responses			
	Assisted		Unassisted	
HARVEST AND OBJECTIVES				
(1) Who determined what trees would be harvested?				
County forester	19		0	
Timber buyer or logger	0		11	
Landowner	0		5	
Other	1		4	
(2) How was timber sold?				
As marked	12		1	
By board foot	3		3	
By cord	3		0	
Diameter limit	0		3	
Clearcut	1		12	
Other	1		1	
(3) How was the sale administered?				
First buyer's offer accepted	4		9	
Highest sealed bid	9		1	
Highest oral bid	5		9	
Other	2		1	
(4) Rate the reason for harvesting timber:	Moderate/High	Low/None	Moderate/High	Low/None
Timber was nature	17	3	17	3
Offered good price	14	6	20	0
Land clearing	0	20	1	19
Pay estate taxes	0	20	4	16
Other income needs	4	16	11	9
Salvage cut	10	10	7	13
Improved residual growth	19	1	5	15
(5) Describe type of harvest:				
Clearcut	2		20	
Seed tree cut	3		0	
Partial cut	15		0	
(6) Objectives that influenced the choice of harvesting method:				
Save trees for seed	6		1	
Did not want clearcut	6		0	
Save timber for wildlife	1		0	
Save timber for future cut	8		2	
Wanted highest possible price	0		17	
Other	4		0	
(7) Rate your satisfaction with the harvest:				
High	17		8	
Moderate	2		7	
Low	1		5	
REFORESTATION				
(8) Was site preparation performed?				
With machines	0		0	
Controlled burn	5		4	
Herbicides	1		0	
Other	2		0	
No action taken	12		16	

Table 2. continued

Characteristic	Number of Responses	
	Assisted	Unassisted
(9) Methods of ensuring reproduction:		
Planted pine seedlings	6	3
Seeded by hand	0	0
Left mature trees	12	0
Selective cut	0	1
Left site to reforest itself	2	16
(10) Did you apply for cost-share assistance?		
State	2	0
Federal	7	3
None	11	17
OWNER INFORMATION		
(11) Were you aware that you could obtain state, industry, or consulting advice on harvests?		
Yes	20	8
No	0	12
(12) Which category best describes where you live?		
City with population greater than 100,000	3	1
City with population 10,000-99,000	3	4
City or town with population less than 10,000	9	9
On a farm	2	3
Rural area, nonfarm	3	3
(13) Average annual income:		
$ 5,000 or less	0	0
$ 5,000-$ 9,999	2	1
$10,000-$14,999	3	2
$15,000-$24,999	3	5
$25,000-$34,999	7	8
$35,000-$44,999	2	2
Greater than $45,000	3	2

significantly more total pine volume before and after harvest than did the unassisted tracts.

Average stand age for the assisted and unassisted tracts was identical—39 years. The acreage harvested was not statistically different; assisted sales averaged 47 acres and unassisted sales averaged 61 acres (computed t-statistic = –1.4873). Site index was estimated for three of the timber sale pairs. The base-age 50 site index averaged 77 for the MFC-assisted tracts and 83 for the unassisted tracts.

Landowners had potentially similar objectives. The types and intensities of timber harvesting on MFC-assisted and unassisted tracts resulted in significant physical differences. Differences in forestry actions and attitudes, however, have been shown to be positively related to certain landowner characteristics. Straka *et al.* (1984), for example, found a positive relationship between forestry investment behavior and the financial positions and forest tract sizes of NIPF landowners in Mississippi. Forestry assistance should therefore be evaluated by comparing the actions of landowners with potentially similar forestry objectives and options. Landowners in the present study were similar with respect to areas of residence, and, more importantly, they were very similar with respect to income (Table 2).

MFC-assisted landowners considered post-harvest conditions. On the assisted sales, post-harvest conditions were a definite consideration. In nearly all of the 20 cases, a partial harvest was performed, with timber sold as marked by the county forester. With MFC assistance, harvests reflected reforestation, wildlife, and potential future timber harvests (Table 2).

Most unassisted timber sales were clearcut with very little consideration for pine regeneration. The harvest volumes were greater on tracts without forester assistance (Table 1), a clear indication of the type of cutting and the intensity of cutting performed in most unassisted cases. Clearcuts without provision for pine regeneration were the most common practice (Table 2), with clearcutting specified in most cases because the landowner wanted to receive the greatest possible income from the sale. Eleven of the twenty unassisted landowners stated that the timber buyer or logger selected the trees to be harvested.

MFC-assisted landowners were very satisfied with their

timber sale results. Satisfaction with the harvest is an important result of MFC timber sale assistance.The MFC-assisted sales were primarily partial harvests, and for pine forest types in Mississippi, partial harvests may be followed by final harvests in 5 to 20 years. The most opportune time to encourage pine regeneration is while plans are being made for final harvest (Royer and Kaiser 1985, Royer 1987)—plans that are likely to include the advice of a forester if landowners were satisfied with earlier harvest results.

Financial Results

With respect to their forestry investments, are landowners who receive MFC assistance in a better financial position than those who sell timber without direct assistance from a forester? *The answer is yes.* Prices received are generally higher, and considering future harvests takes advantage of the marketing flexibility of standing timber.

Timber sales with forester assistance receive higher prices. Technical forestry assistance has been shown to increase the timber prices received by private landowners in Montana (Jackson 1985) and Georgia (Cubbage *et al.* 1985).

In the present study, direct price comparisons are difficult because of incomplete data—a high proportion of the unassisted landowners chose not to report timber prices, and because averages of the incomplete, unpaired data tend to mask geographic and temporal price variations.

The average pine pulpwood price for assisted sales was $11.71, and for unassisted sales the average price was $10.55 (with 7 and 4 observations, respectively). The 11 percent difference is relatively small, as expected for pulpwood, since pulpwood prices are not as variable or as buyer-sensitive as sawtimber prices. The pine sawtimber prices averaged 20 percent higher for assisted sales; sawtimber prices were $160/MBF (Doyle) for assisted sales and $133 for unassisted sales (with eight and and four observations, respectively).

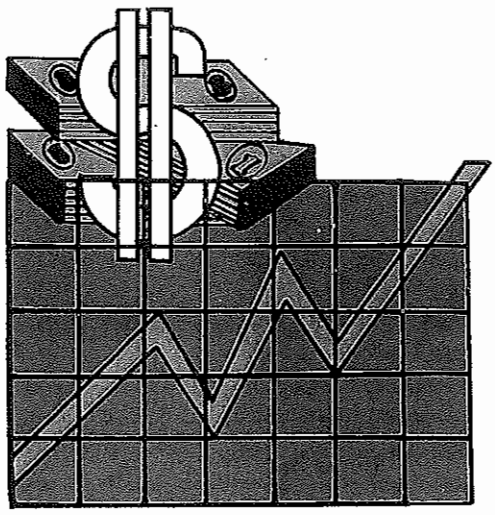


Figure 2. Landowners who receive assistance from a forester generally receive higher prices for timber than those who sell without assistance.

Another problem in comparing timber prices relates to the way in which stumpage value is determined. Stumpage value is the amount remaining when expected logging, transportation, and processing costs are subtracted from the value of products that can be processed from a specific stand of timber (Duerr 1985). With other factors equal, logging costs per unit of timber are higher for partial harvests than for clearcuts, and timber prices are therefore lower. Prices should be compared between forester-assisted clearcuts and unassisted clearcuts, or between forester-assisted partial cuts and unassisted partial cuts. Our sample of timber sales in Mississippi precluded such a comparison and the stumpage price difference for pine sawtimber may therefore be very conservative. Only two of the eight observations for pine sawtimber prices on assisted sales were for clearcuts; all unassisted sales were clearcuts, yet there was still a $30/thousand stumpage price difference for assisted sales. The sawtimber price comparison was for sales from comparable geographic areas within the state.

Although not a direct price comparison, higher prices with forester assistance in Mississippi were also very clearly indicated by the methods of sale administration. Consulting foresters and public agency foresters most frequently recommend that timber be sold with sealed bids—per unit prices are usually higher when buyers know they are competing with other buyers. Of the MFC-assisted sales, nine were sold for the highest sealed bid; of the unassisted sales, nine were sold to the first buyer that made an offer (Table 2).

Partial harvests allow flexibility in future marketing decisions. Before selling timber, the biological needs of a stand and current and expected future market conditions should be considered. One of the distinctive aspects of forestry is the ability of a stand *"to produce a salable product over many years—there is great flexibility in the time of harvesting"* (Gregory 1987). With partial harvests, MFC-assisted landowners are flexible in the timber **products** they can sell and in their **timing** of future harvests.

The financial importance of maintaining flexibility in timber marketing decisions in Mississippi is evident from present market conditions and price projections. Stumpage prices are low at present, and they have been relatively low for several years (Figure 3).

A recent projection for Mississippi, however, estimates pine sawtimber prices between 1996 and the year 2000 will be 34 percent higher than from 1981 to 1985, after accounting for inflation (Resource Information Systems, Inc. 1985). For 34 percent higher prices in 15 years, the compound rate of real price appreciation would be 2 percent per year.

The USDA Forest Service (1987a) projects softwood stumpage prices in the U. S. South to increase at an even higher compound rate—3.1 percent per year. Mississippi landowners with stands that can be harvested within the next 20 years will enjoy the financial rewards of real price increases compounded with growth increases, a reward that will not be available for recently clearcut areas.

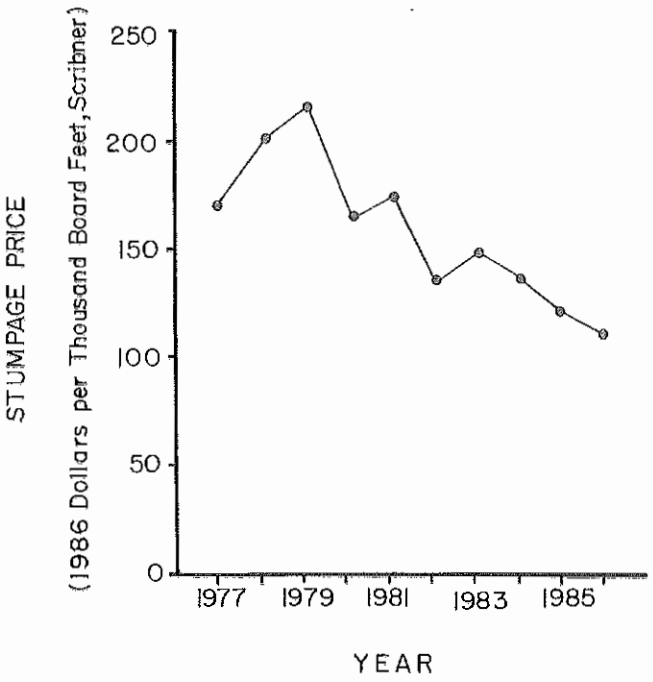


Figure 3. Stumpage prices have been relatively low for several years. Flexibility in the timing of harvests is extremely important to rates of return from forestry investments.

Social Benefits and Costs

Is timber sale assistance in Mississippi an efficient use of public dollars? *The answer is yes*—even with very conservative assumptions about the benefits from such assistance.

The social benefits and costs of MFC assistance are marginal benefits and costs—the additional benefits and the additional costs of direct assistance for timber sales. The cost of county forester activities are compiled annually by the Commission. On tracts below 40 acres, the costs of MFC timber marking assistance were $8.67, $9.06, and $8.87 per acre, for fiscal years 1983, 1984, and 1985, respectively (Sims 1987). The costs are a statewide average, and they include all of the overhead, labor, and miscellaneous expenses associated with timber sale assistance.

Several assumptions are necessary to estimate the marginal social benefits of MFC timber sale assistance. Values must be assumed, for example, for prices, yields, and other variables associated with different management practices (Table 3). Based on the sample of 40 timber sales in Mississippi, the analysis initially assumes that MFC-assisted landowners perform partial harvests and unassisted landowners clearcut their stands.

Another important assumption for comparing assisted and unassisted timber sales is the proportion of benefits that can be directly attributed to MFC assistance. The analysis initially assumes all benefits are from MFC assistance. The initial assumptions that are liberal are then examined, and assistance costs are compared with very conservative benefit estimates.

Public timber sale assistance dollars are an investment, expected to have a positive return to society. Under the initial assumptions outlined, the MFC program has a 12 percent rate of return. The 12 percent estimate is net of inflation, and reflects both conservative and liberal assumptions.

The estimate is *conservative* since no stumpage price differential was assumed, and since many social benefits of pine regeneration and management have not been included. The benefits of erosion control and increased future softwood timber supplies, for example, are ignored in the 12 percent rate. Conversely, the estimate is *liberal* since it was assumed that all assisted sales would be partial harvests and all

Without assistance from a forester, clearcuts without provision for pine regeneration were the most common practice.

Table 3. Initial assumptions for estimating the marginal benefits of MFC assistance for nonindustrial private timber sales.

Item	Assisted	Unassisted
Type of Sale	Partial Harvest	Clearcut
Volume		
Initial	9,200 bd.ft. (Scribner),[1] 7.8 cds.	9,200 bd.ft. (Scribner), 7.8 cds.
Harvested	3,200 bd.ft. (Scribner), 7.8 cds.	9,200 bd.ft. (Scribner), 7.8 cds.
Next harvest	11,320 bd.ft. (Scribner) in 8 years	Value included in land expectation value[2] (below)
Regeneration	Provided after harvest; land expectation value of $200/acre assnmed.	No provision for pine; land expectation value of $50/acre assumed.
Prices	$138/MBF (Scribner), $11/cd. 3.1% per year real price appreciation (for next harvest)	$138/MBF (Scribner), $11/cd. Not applicable (area clearcut)
Costs	$9/acre for initial timber sale assistance	Not applicable

[1] Schumacher and Coile (1960); loblolly pine yield for a natural stand in the coastal plains, age 40, site index 70.

[2] Land expectation values represent the present value of all future net income and therefore embody several assumptions themselves. The values assumed in the analysis are based on expected yields, prices, and costs for Mississippi, using a discount rate of 4 percent. The rate of return results are not highly sensitive to the land expectation values assumed.

unassisted sales would be clearcuts (given similar initial stands), and since it was assumed that all of the benefits of partial harvests (followed by final harvests and pine regeneration) versus clearcuts (without pine regeneration) were directly attributable to the MFC costs of timber sale assistance. In reality, some landowners will practice good forestry without assistance and some will practice poor forestry even though they receive technical assistance.

Maintaining the conservative assumptions, how sensitive is the 12 percent estimate to the initial liberal assumptions? Figure 4 illustrates the relationship between the proportion of benefits attributable to MFC assistance and the program's rate of return.

If the social discount rate is 4 percent, then MFC timber sale assistance is an efficient use of public funds, even if less

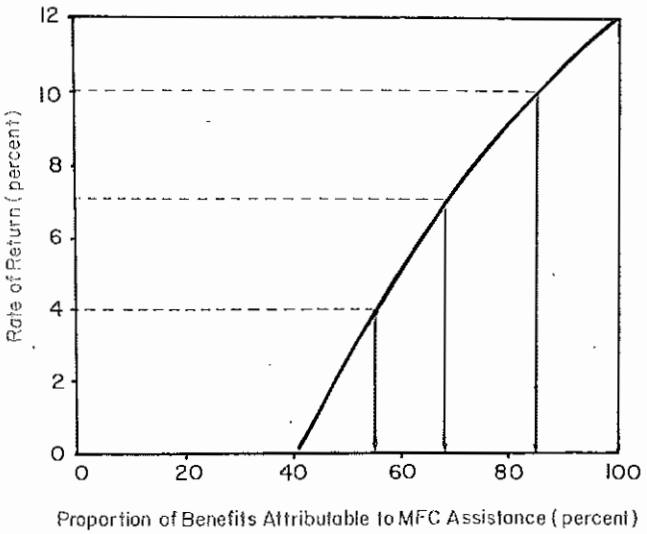


Figure 4. Rates of return to society are favorable under a wide range of assumptions about the benefits of timber sale assistance.

than 60 percent of the differences actually occur and are due to assistance. For 7 and 10 percent discount rates, the program must directly account for 70 and 85 percent of the estimated benefits. The timber sale assistance program yields good returns to society, even with very conservative estimates of program benefits.

Discussion

The economic and social potential of Mississippi's forests was recently examined in a planning effort known as *Pathways for Forestry* (see Mississippi Forestry Commission 1983). Twenty-one forestry goals were identified in the planning effort, and increasing the annual rate of reforestation of NIPF lands ranked number one (Cole 1984). The purpose of increasing NIPF reforestation was "to assure that Mississippi will furnish its share of the softwood timber requirements for itself and the nation in the future.

The present study addressed future timber inventory; since MFC-assisted timber sales were partial harvests, regeneration decisions will be made in the future. The high degree of satisfaction with their partial harvests assures that many MFC-assisted landowners will seek the advice of a forester at final harvest, the time when reforestation options should be considered.

MFC assistance for NIPF timber sales in Mississippi has physical and financial results that are positive for the state and the nation. The relative benefits and costs were compared by examining the rate of return for assistance funds. The study therefore addressed another goal of the *Pathways for Forestry* effort—to develop cost/benefit comparisons for all public forestry programs. Public programs must be effective, but must also be able to demonstrate cost-effectiveness if they are to compete for limited state and federal funds.

From the standpoint of society, it is very beneficial for technical forestry assistance to be available to NIPF land-

owners with merchantable timber. For society, of course, the important issue is whether or not a forester is consulted when planning a sale, not whether the forester is publicly or privately employed. This study indicates the general importance of a specific type of public forestry assistance. Other types of public assistance have also been evaluated in Mississippi. Straka *et al.* (1986) for example, appraised the economic results of MFC service forester activities.

Forestry consultants, MFC personnel, and other professional foresters are extremely important sources of information and service in all areas of forestry. Their efforts to ensure active forest management and reforestation are society's foremost defenses against the conditions cited in the introduction—conditions which could lead to "declines in employment in the forest products industries."

Literature Cited

Bylin, C. V. 1982a. Volume prediction from stump diameter and stump height of selected species in Louisiana. Res. Pap. SO-182, USDA For. Serv. South. For. Exp. Sta., New Orleans, LA, 11 p.

Bylin, C. V. 1982b. Estimating DBH from stump diameter for 15 southern species. Res. Note SO-286, USDA For. Serv. South. For. Exp. Sta., New Orleans, LA, 3 p.

Cole, L. A. 1984. Mississippi's forests: a plan for economic and social development. Innovations, Council of State Governments, Lexington, KY, 8 p.

Cubbage, F. W. 1985. Study guidelines for evaluating state forestry programs (unpublished). Univ. of Georgia, Athens.

Cubbage, F. W., T. M. Skinner, and C. D. Risbrudt. 1985. An economic evaluation of the Georgia Rural Forestry Assistance Program. Univ. of Georgia, Coll. of Agric. Exp. Sta. Res. Bull. 322, 59 p.

Duerr, W. A. 1985. Forestry Economics as Problem Solving. Copyright William A. Duerr, Blacksburg, VA.

Freese, F. 1974. Elementary statistical methods for foresters. USDA For. Serv., Agric. Handbook 317, 87 p.

Gregory, G. R. 1987. Resonrce Economics for Foresters. John Wiley & Sons, NY, 477 p.

Jackson, D. H. 1985. An examination of some physical and economic effects of Private Forestry Assistance in Montana. Univ. of Montana, mimeo, 42 p.

Mississippi Forestry Commission. 1983. Pathways for forestry in Mississippi. Report No. 1, Symp. Summary, Jackson, MS, 12 pp.

Pettry, D. E. 1977. Soil resource areas of Mississippi. Miss. Agric. and For. Exp. Sta. Info. Sheet 1278, 3 p.

Resource Information Systems, Inc. 1987. The Timber Situation in 12 Southern States, Projections of Forest Area, Inventory, Growth, Harvest, and Prices through 2015. Mississippi Section. 33 p.

Royer, J. P., and H. F. Kaiser. 1985. Influence of professional foresters on pine regeneration in the South. S. J. Appl. For. 9(1):48-52.

Royer, J. P. 1987. Determinants of reforestation behavior among southern landowners. For. Sci. 33(3):654-667.

Shumacher, F. X., and T. S. Coile. 1960. Growth and Yields of the Southern Pines. Copyright T. S. Coile, Inc., Durham, NC, 115 p.

Sims, M. 1987. Personal communication with the Mississippi Forestry Commission Planner.

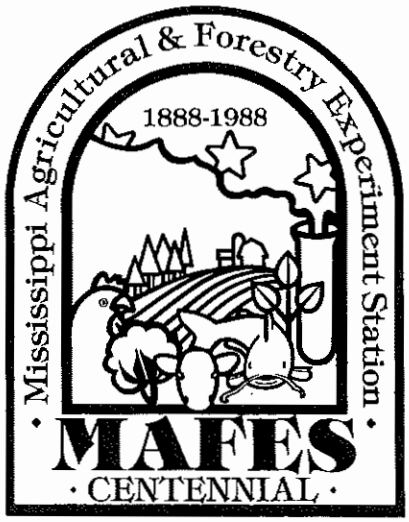
Straka, T. J., H. W. Wisdom, and J. E. Moak. 1984. Size of forest holding and investment behavior of nonindustrial private owners. J. For. 82(8):495-496.

Straka, T. J., W. C. Anderson, and S. H. Bullard. 1986. An economic appraisal of service forester activities in Mississippi. Miss. Agric. and For. Exp. Sta. Tech. Bull. 137, 15 p.

Timber Mart South. 1987. 1986 Yearbook. Timber Marts, Inc., Highlands, NC, 285 p.

USDA Forest Service. 1987a. The South's fourth forest, alternatives for the future. (Draft). USDA For. Serv., Washington, D.C.

USDA Forest Service. 1987b. Report of the Forest Service, 1986. USDA For. Serv., Washington, D.C.



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