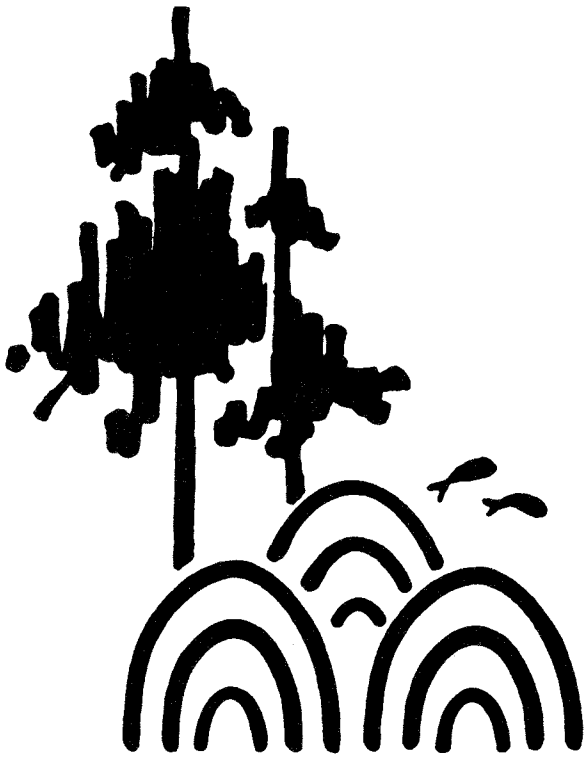
Cultural, Management and Economic Research Needed to Assist the Non-Industrial Private Forest Landowner in the Southeastern U.S. — a Problem Analysis —



Publication No. FWS-5-82

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INTRODUCTION

Much attention has been directed in recent years to finding ways of increasing the productivity of private non-industrial forest land ownerships in the South. Justification for the interest directed towards this ownership lies in its collective size, physical accessibility, potential for intensive management and the annual erosion of land base and growing stock of southern forests.

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Major contributions to this analysis were provided by the following Problem Analysis Team members: R. M. Burns, U.S. Forest Service, Washington, D.C.; G. F. Dutrow, U.S. Forest Service, Durham, N.C.; R. B. Geddes, Virginia Division of Forestry, Tappahannock, VA; E. P. Jones, U.S. Forest Service, Macon, GA; S. R. Miller, Chesapeake Corporation, West Point, VA. Recognition is given to Southeastern Forest Experiment Station for the grant supporting the analysis, and to J. C. Hendee, Asst. Station Director, for his assistance in the initiation of the project.

Non-industrial private owners collectively are a most influential group, in position to shape the future posture of forestry and the quantity and quality of benefits to be obtained from forest lands. The manner in which these landowners husband their ownerships will determine progress made in arresting soil erosion, providing adequate supplies of potable water, maintaining a wildlife resource for consumptive and non-consumptive uses, continuing forest environments as a locale for recreational uses, and assuring a continuing supply of timber at reasonable costs for an expanding population.

There is little doubt concerning the need to encourage greater production from these lands. By its sheer size, the non-industrial private ownership is the key to achieving gains in forest production. This ownership controls more than 70 percent of the forest land in the South. These owners must provide the major means of meeting projected increased needs in the goods and services derived from forest lands. As later paragraphs show, anticipated future needs surpass present productivity for southern pine. The productive potential exists for the South to meet anticipated future needs, but to do so the non-industrial private ownerships must increase the amount of forest land supporting southern pines and must husband more intensively the southern pine forest.

Non-industrial private landowners are a diverse group. They vary widely in their methods and reasons for acquiring forest properties, objectives of ownership, knowledge of forest management, financial capabilities and interests in enhancing the productive and financial values of their properties. Motivation is often lacking for them to enhance the value of their ownerships by increasing production.

To define research priorities to assist these owners, a cooperative effort was initiated by the Southeastern Forest Experiment Station of the U.S. Forest Service, the Virginia Division of Forestry and the School of Forestry and Wildlife Resources at Virginia Tech. Some funding was provided by the Station and a Problem Analysis Team organized. This team met three times during 1981, planned the approach taken, reviewed and made suggestions on the sequence of manuscript revisions, and participated in the ranking of research priorities. Suggestions, preliminary manuscript review, and research priority ranking were solicited from a Technical Review Panel (See Appendix A). The resulting analysis presented here is a synthesis of the viewpoints of individuals representing governmental agencies, associations, wood-using industry, private landowners and forestry educators throughout the southern pine region. The prime objective is to assure an adequate supply of southern pine to meet projected needs, while assuring non-industrial private landowners that investments in forest production are financially sound.

FOREST AREAS OF THE SOUTH - PRESENT AND FUTURE

The total land area of the United States is some 2.25 billion acres, 487 million acres being commercial forest lands. The southeastern states, extending from Maryland to Texas and encompassing the natural range of the southern pines, contain 171 million acres of this commercial forest land.

Table 1
Area of Forest Land in the South
By Ownership, 1977. (Thousands of Acres)

National Forest	10,151.6	5.9%
Other Public	5,757.1	3.4
Forest Industry	33,641.4	19.6
Other Private	121,740.2	71.1
Total	171,290.2	100.0%

Source: Forest Industries Council (1980).

Well over 50 percent of the commercial forests of the south are pine and pine-oak forests. The South furnished 45 percent of the nation's softwood needs in 1976, compared to 41 percent from the Pacific Northwest. Projections are that, by the year 2030, the South will produce 50 percent of the softwood needs of the country as compared to 31 percent by the Northwest. The net result of this shift, combined with projected increased total softwood usage, is a need for doubling by 2030 the southern pine timber cut in 1976.

Table 2
Area of Forest Land in Pine and Pine-Oak
Type, by Ownership, 1977. (Thousands of Acres)

Public	8,684	9.6%
Forest Industry	22,407	24.9
Other Private	58,761	65.5
Total	89,652	100.0%

Source: Forest Industries Council (1980).

The forests of the South are owned and controlled by a highly diverse group of organizations and individuals. With some variation by individual state, 10 percent of the southern pine forest is owned by governments; 25 percent is owned and managed by industry; and the remaining 65 percent is owned by a large group of private individuals, partnerships, family corporations and others, with varied ownership objectives and management capabilities.

Prospects for increasing productivity of pine on suitable sites varies by ownership. Publicly owned lands, federal, state, and local, are managed under a fairly high level of productivity when one considers the multiple objectives of public ownership, of which increased timber production may not be a dominating goal. Some increased production from these lands will be realized as new technologies develop, genetically improved materials in plantations reach harvestable age and nutrient supplements are tried. However, the relatively small percentage of publicly owned lands plus legislated multiple use policies preclude any large increases in timber production from publicly owned forests.

Industrial ownerships in general are managed at a reasonably high level of productivity, and increased productivity is expected with the use of new silvicultural technologies. Also, industrially controlled acreage may be expected to increase slightly at the expense of private holdings. Nevertheless, the increase realized will fall far short of providing the anticipated needs from the South.

In the next half-century, just as now, non-industrial private landowners will own and control the majority of the southern pine forests. Total acreage available for timber production will decrease, however. Food production, rights-of-way, urban development, watershed protection, water impoundments and other uses will erode acreage from the forest land base.

In summary, if predictions are accurate, southern pine forests must provide double the quantity of timber they now produce from a shrinking forest land base. Only token increases in productivity can be

expected from publicly-owned forest lands and only a fraction of the total needed increase will be available from industrially-owned lands. By far, the greatest share of any increased production must come from the 65 percent of forest land owned and controlled by non-industrial private landowners.

MANAGEMENT CHANGES IN THE SOUTHERN PINE FOREST

The condition of the southern pine forest is changing, but not in the direction of increased yields. In the period 1970-1977, loss of pine and oak-pine forest type amounted to 4.7 million acres in the South (Va. Division of Forestry, 1980), a loss of 4.8 percent of the 1970 acreage. This is due in part to the failure to regenerate stands back to pine as they are harvested, with subsequent reversion to hardwoods of lower value. Efforts in regeneration and reforestation, particularly pine planting, have been sporadic over the last 15 years. On non-industrial private woodlands in the South we are annually planting only 45,000 acres more now (1980) than were planted in 1965, a low point in the program.

The high point for acres of pine planted in the south was reached with the Soil Bank Program of 1956-1961 (Williston, 1980). In 1959, approximately 1,600,000 acres were planted, 1,100,000 of them on non-industrial private lands. By 1965, six years later, and after the Soil Bank Program ended, this latter figure had fallen to 230,000 acres per year, only 20 percent of the acreage planted on non-industrial lands at the height of the Program. These plantings constitute a large part of the pine supply being harvested in the 1980's.

If predictions of softwood needs (National Forest Products Assn. 1980) are accurate, sufficient trees are not now in the ground to avert a shortage around the turn of the century without overcuts -- cutting into the growing stock base -- beyond the annual growth. Looking further ahead, to 2030 - the year when prediction for doubling the cut will culminate, serious shortage of timber and consequent economic disruptions are envisioned unless increased regenerated acreages are initiated during the 1980's.

Pine sawtimber volume increases have been reported in some areas of the South during the past decade (USDA Forest Service 1978). Often not identified in these reports, however, is the movement of ingrowth materials, the 2 to 4 inch diameter classes, into merchantable size classes with consequent loss of replacement ingrowth materials. This condition was especially noted for non-industrial private lands by a 1981 survey in Virginia (Sheffield and Craver 1981). The failure to have new ingrowth materials in place is the direct result of reduced establishment efforts after the mid-1960's and is an underlying cause for the shortage expected in the 1990's.

At least one million acres per year of non-industrial private lands must be replanted by 1990 if demand for southern pine is to be satisfied. Brissette (1982) estimates there is now only enough nursery capacity to replant 721,000 acres annually, if all plantations are successful. Industrial lands are regenerated as harvest cuts are made. Industries have more than doubled the annual acreage of land regenerated in the past ten years. The gap occurs on the non-industrial ownership, where only one out of every nine harvested acres is estimated to be reforested. If the South is to retain its lead in production of pine timber and reach the goals predictions call for, intensified efforts in reforesting non-industrial ownership are necessary.

ECONOMIC CONCERNS OF THE NON-INDUSTRIAL PRIVATE LANDOWNER, FORESTERS AND POLICYMAKERS

Individuals acquire, retain and dispose of forest property for many reasons. Timber production is oftentimes not a primary reason for ownership, and thus motivation and capabilities for enhancing production vary greatly. Many owners recognize an economic advantage in maintaining productive stands and make the necessary commitments and financial investments to do so. Others recognize the advantages but lack the resources to do so. A third group fails to recognize any incentive for enhancing production and does not consider forestry investments a viable alternative for their investment capital.

From a societal viewpoint, increased production of southern pine is desirable. From the perspective of many individual landowners, however, enhancing production is desirable only if the financial resources committed offer promise of returning a financial yield at least equal to alternative investments. If this contrast between societal goals and individual goals is resolved, and societal goals are to be met, public and private programs need to be undertaken to bring individual goals more in line with societal goals, i.e. create a climate in which increased forest production is attractive for the non-industrial landowner. This requires identifying those concerns which deter landowners from making commitments to regenerate forest lands and to manage their properties for continued forest production. Once identified, these concerns may be addressed by research to create a climate in which landowners are encouraged to regenerate and manage their holdings.

Deterrants to increasing regeneration and management activities by non-industrial private landowners have been reviewed as part of this analysis. As identified by the landowners of the South (USDA Forest Service 1979), major needs are changes in federal and state tax laws, increased technical assistance and increased educational efforts to reach more landowners. Each of these and the many other concerns have been addressed by existing programs and by research. Additional efforts are contemplated. In Appendix B an effort has been made to assemble a comprehensive list, undoubtedly not complete, of these concerns, each phrased in terms of a research project, with correlated notation on many items of where research on the subject is or recently has been underway.

Recent developments on the economic side may be classified as follows:

A. Taxation Policies

i. Capital gains. Taxation rates have been reduced and upon full implementation in 1985 an effective federal tax rate of 20 percent on capital gains will be in place.

ii. Estate and Gift Tax Credits. Upon full implementation in 1987, estates of up to $600,000 value will be shielded from Federal estate taxes. In addition, gift tax policies have been liberalized.

iii. Property taxes. Taxation policies and rates vary by state and locality, but "present use" taxes and rural tax districts are providing some relief.

B. Management Costs

i. Long-term capitalization and expensing management costs. Public Law 96-451 allows a ten percent investment tax credit plus seven-year amortization on the first $10,000 of capitalized reforestation expenditures each year.

ii. Cost-sharing. Federal FIP program is still in effect but funding policies are uncertain on a year-to-year basis. Tax status of cost-share monies as ordinary income is uncertain. Several states have cost-share programs in place and others are studying them.

C. Market Stability

i. Both demand and stumpage prices are dependent on the market and therefore subject to wide variation as exhibited by the low demand and soft prices currently prevailing. Price reporting services are becoming available.

TECHNICAL ASSISTANCE AND INFORMATION NEEDS

Landowners need technical help in decision-making and in implementing forest establishment and management at levels consistent with individual goals and financial abilities. Too often, they perceive, or are advised, that no effort is valid short of complete site preparation and planting. While such intensive efforts are often necessary, less intensive and less costly practices may sometimes offer a viable choice and yield acceptable growth rates on sites which otherwise would be neglected.

One of the best statements of justification for less-intensive management and regeneration practices for the non-industrial landowners, is given by Box (1982):

> "In an article entitled, "Regeneration for the Third Forest," Boyce and Knight (1979) made an interesting point about non-industrial forest landowners. It was simply that we cannot expect more forestry investments from these non-industrial owners than they perceive to be in their self-interest. In the South, thousands of these landowners must perceive little or no investment is in their best interest since they sell the current pine stumpage with little regard to regenerating it back to pine by any method. Developing a management plan for extensive forestry with this group is not an easy task.
>
> Some of the problems to be overcome include:
>
> A. Owner objectives for his land may not involve forest management.
> B. Lack of adequate stocking of desirable species.
> C. Lack of "extra" money to implement the needed practices.
> D. Lack of interest in forestry as a long-term option for his land.
> E. Lack of knowledge about natural regeneration methods or know-how in implementing them.
>
> In order to convert these "problems" into opportunities, a professional forester would need to provide workable management options for the landowner. This could be done by encouraging and helping him (by providing the proper tools) to realistically determine if timber production is one of the viable options for his land. Once this is established, a management plan can be developed for his property. Emphasis should then be placed on the possibility of building up stocking through natural regeneration and improving species composition with low cost management techniques where possible. If this is primarily a pine forest, the forester can make a series of visits to determine if sufficient numbers of seed-bearing trees of desirable species exist. Assuming this is the case, a plan similar to the natural regeneration scenario previously outlined could be carried out. Attention should be given to minimizing cost and labor while optimizing the return on his investment in activating the plan's recommendations.

> When comparing extensive management with intensive management, one can readily see some direct cost savings by using extensive techniques. May I be quick to note that intensive techniques are not cost prohibitive to all landowner groups. However, if fiber production is the goal, the high initial cost of intensive site preparation can be a deterrent to some forest owners such as the small non-industrial. With this in mind, I feel we can get more of them to practice some degree of forestry for fiber production on their lands by encouraging their use of extensive management techniques. Some management is better than no management."

Among these problems are areas in which current knowledge is probably sufficient to meet needs and others for which additional research is necessary before recommendations can be made with confidence. For example, sufficient methodology is known to make recommendations and offer alternatives, along with cost and return data, to landowners wishing to prepare sites intensively and plant loblolly pine. Less confidence is had in recommending a shelter-wood cut to be followed by natural regeneration, although Baker and Murphy (1982) have shown that with natural seed sources a selection forest of loblolly- shortleaf pine can equal a clearcut stand in total volume production over the first 36 years of the rotation. Uncertainties of seed crops, understory competition and other potentially adverse factors increase the hazards of recommending natural regeneration alternatives. Similarly, harvesting methodology, equipment options and costs are fairly well established for harvesting large tracts, but suitable equipment and methodology are not so well known for use on smaller ownerships.

PROBLEM ANALYSIS PROCEDURE

Voids exist in the knowledge, techniques and methodology available to assist non-industrial owners to manage profitably forest lands for southern pine at all degrees of intensity. Identification of major

areas of research and development to stimulate increased forest production is a major objective of this report. Prior to making recommendations, however, it was necessary to identify on-going research and development applicable to the non-industrial landowner. A report from the CRIS[1] data base was obtained, covering all federal and land-grant university research projects that might relate to the subject. Other listings were studied (Southern Industrial Forestry Research Council 1981), (USDA Forest Service 1981a), (USDA Forest Service 1981b), (Dutrow 1982), (Virginia Division of Forestry 1980), (Burns 1980) and information was provided by members of the Technical Review Committee. The result is Appendix B, which lists the many subjects on which pertinent knowledge is needed to promote the objective of this study, annotated with some of the research under way. The list is probably not complete. It does not include industrial research applicable to non-industrial lands. But it does indicate the breadth of research which might prove meaningful to private forest owners.

RESEARCH PRIORITY

The final stage of the problem analysis was to attempt to distill, from the review of known current research, from listings of proposed research areas, and from accumulated revisions of manuscripts, a limited list of major broad research projects that seemed to stand

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[1]Cooperative State Information System, operated by the Cooperative State Research Service, U.S.D.A. Washington, D.C.

foremost in the minds of foresters in the Southeast as needing early research to break existing barriers preventing lands of non-industrial private owners from being more productive. Such a list of 12 projects was compiled and sent, without priority ranking, to the Technical Review Committee (see Appendix A), which was selected to be familiar with the problem and representative of a diversity of viewpoints, interests, and employment.

The project list was attached to a statement of the problem situation, closely akin to the first sections of this article. Each committee member was asked to rank the 12 project areas in the order in which he felt new research effort should be directed. No attempt was made to try to prescribe criteria for ranking, each person was left to apply his own value system.

General Conclusions

Several general conclusions from this analysis process are cited before listing the specific research projects in their priority order.

1. Both biological-technical and economic-policy-administrative problems need research attention. Although this problem analysis process in its original conception was oriented toward "silvicultural" methods, discussions among the Analysis Team and replies from others consulted, indicated that economic questions could not be excluded. People wanted to focus on financially feasible methods, and financial feasibility had to include consideration of governmental cost-sharing programs. Therefore economic projects were included.

2. There are sharp diversities of opinion on research approaches

and priorities. Even among knowledgeable people with long experience dealing with non-industrial private woodlands on both the Analysis Team and the Technical Review Committee, the ranking exercise showed definite differences as to which problems should be attacked first. Recognition of the diversity that exists is important in understanding why strong research programs have not been implemented in the past. Nevertheless, to the extent that the 16 people who did the ranking were representative of informed technical foresters, some strong priorities were brought out.

3. There are wide differences among non-industrial private landowners in their financial conditions, desires for use of land, and condition of forested areas. A research program that seeks to define the "typical" owner and then develop a silvicultural and financial approach suited just for him will be too limited in scope to bring about a material increase in timber productivity.

Research Problem Priorities

The 12 research areas presented to the Technical Review Committee are listed below in order of composite priority ranking, the most important first. The reader is reminded that this list includes only research thought by some to be very important; low ranking here does not indicate unnecessary research. The wording in parentheses is exactly that provided the committee:

1. Chemical Control of Vegetation. (Intensify efforts in development, application techniques, and cost effectiveness of chemical control of competing vegetation.)

This item had the same composite ranking as item 2, but received one more first priority ranking. Other research priority groups have given it very high ranking. Research on competing vegetation was ranked 6th out of the 10 most important projects the SIFRIC (Southern Industrial Forestry Research Council 1981) and the use of chemicals for site preparation was referred to in two other of the 10 projects, including the first. The need for "improved vegetation management procedures" was among the top five research goals for the Southern Region listed by RPG-2 (USDA Forest Service 1981a).

The great interest in this topic stems from the promise herbicidal chemicals have shown for greatly reducing pine release and site preparation costs, as demonstrated by the wide usage of 2,4-5,T before its use for these purposes was suspended by E.P.A.

A question was properly raised, asking if the Auburn University Silvicultural Herbicides Cooperative isn't already doing sufficient research on this subject. The Analysis Team concluded, however, that a much wider effort is needed using differing chemicals, in differing regions of the Southeast, and under differing sites and forest conditions, more than a single group can accomplish.

2. Site Preparation Alternatives for Small Tracts. (Evaluate combinations of mechanical, chemical and fire methods for cost and effectiveness for plantations and natural regeneration.)

The high importance given site preparation is indicated by its receiving the 1st priority ranking by SIFRIC and its designation as an area of emphasis in the top five research goals of RPG-2.

Although there is widespread use of many methods, insufficient research information is available to permit minimum cost procedures to be prescribed for the great variety of sites and forest conditions encountered. The high cost of large scale mechanical methods currently widely used puts them out-of-reach of many non-industrial owners, resulting in the loss of pine acreage after logging. Prescribed burning promises to be a cheaper method if adequate smoke management methods can be developed and applied. Patch and strip scarifying methods are finding application in Canada, with special equipment for low cost application being developed. It should be tried here in combination with fire and/or chemicals.

3. Factors Affecting Investment in Forest Management on Non-Industrial Private Forests. (Develop strategies for successful investment in forest management when ownership objectives include a range of priorities that affect income production.)

This rather vague project statement evolved out of discussion of how to develop low-cost strategies for the total management process (selling-harvesting-regenerating-release-stand manipulation) including consideration of natural regeneration and direct seeding options. Natural regeneration, including all-aged silviculture, has its advocates and deserves research attention. Perhaps the best statement supporting natural regeneration is given by Box (1982). Yet many foresters sharply oppose it, citing the lack of species, genetic, and spacing control and the uncertainty involved. Certainly a consistent and long continued program of carefully sequenced operations is involved for successful implementation. Carefully researched trials of natural regeneration and "extensive

management" are needed, as are prescription data for successful application. This project is closely related to the next.

4. Enhanced Technical and Information Delivery Systems. (Devise methodologies for agencies, industries, consultants, and others to coordinate information delivery systems for non-industrial landowners.)

Several Technical Reviewers considered this the most critical item of all. However, as the Analysis Team looked at the volume of technical and market information needed by a forest owner, the great variety of ownership characteristics affecting forest management decision, and the changing information base as more research results come in, it became apparent that no simple system of a few leaflets and newspaper articles is going to make an efficient forest manager out of each woodland owner. It is doubtful if even the cadres of service foresters and consulting foresters who advise owners are adequately up-to-date with new forest land treatments, biological response data, and investment planning methods to provide owners the best answers in the time usually available. Here is a wide-open field of research into the technology transfer process from researcher to forest owner and how that process can be improved to promote the best decisions (Gwin and Lionberger 1980). Such an investigation would not be traditional forest silviculture research, but it is crucial to application of successful methods.

One early conclusion of the analysis found that there had been many landowner attitude and characteristic studies and that adding another such study was not necessary. Royer et al. (1980) have just

completed a thorough review of 21 such studies covering all or parts of 22 states during the past 30 years. They concluded that 100 to 150 empirical surveys of this type were completed since 1940. As a result they have designed and are implementing in 12 southern states a new survey of 1000 landowners who have harvested timber within the past 10 years. Until that study is complete, including as it does a careful comparison of landowner post-harvest actions with an analysis of his best investment options, no further research in that area seems desirable. Research on how to make the landowner aware of his best re-investment option is likely to be the most productive follow-up research project.

5. Effects of Harvesting Systems on Site Preparation Costs for Small Tracts. (Establish cost relationships between degree of harvesting, i.e., conventional, whole-tree, fuelwood cleanup, and subsequent site preparation costs.)

Harvesting operations which leave large accumulations of branches, tops, and uncut trees greatly increase the investment the owner must make in subsequent site preparation to regenerate a pine stand. Research is needed in how to adapt whole-tree harvesting or other biomass removal methods to leave a clean site for low-cost regeneration. Where markets exist for energy wood, opportunities for clean harvests with low site preparation cost may exist.

6. Equipment and Techniques for Harvesting Non-Industrial Private Forests. (Investigate present equipment having potential for harvesting small tracts, and appropriate equipment modifications.)

Logging equipment development in the past two decades has trended toward larger and more expensive machines for handling high timber volumes efficiently. Such machines are not adapted for small tracts, thinnings, and small trees. Developmental research is needed for smaller, less costly equipment and for ways to modify existing farm machinery for part-time forest harvesting.

7. Evaluate Alternative Public Investment Methods for Interesting Landowners in Greater Wood Output. (Evaluate effectiveness on wood production of various public investments such as tax incentives and subsidy payments.)

Recent years have seen several legislated approaches to providing financial incentives for more careful forest management. These include state and Federal programs of cost sharing for regeneration and related practices. Also, special treatments in Federal and state income tax systems have increased in the past few years. Some evaluation of why these approaches are or are not used by certain owners would be helpful in making them more effective. Questions of this type are incorporated in the survey by Royer et al. Other researchers are actively at work in the forest tax area (Olson et al. 1981). Recognition of on-going research perhaps accounts for this item being ranked no higher than it is. There is also the claim in some quarters that such laws may act to some extent as disincentives, because owners may delay economically justified forest regeneration investment until a subsidy payment is available.

8. Analysis of Long-Term Timber Supply from Non-Industrial Forests. (Develop and test an empirical model for predicting supply from this source in the Southeast.)

Construction of such a supply model, perhaps by state or other regional subdivision, is recommended to permit estimation of the flow of wood products at various levels of public and private investment. Also it would compare the productivity of such investments with productivity of equal investments in industrial or public lands.

While the need for such research was recognized, it received a relatively lower priority because extensive studies of this type are being made by the U.S. Forest Service, as part of the RPA process and in other projects at the Southeastern Forest Experiment Station (8) and by the National Forest Products Association (9).

9. Economics of Thinning and Other Intermediate Stand Management Practices for Firewood and Other Products. (Growth responses to thinning can be predicted. However, the economics of thinning have not been adequately determined.)

With growing markets for fuelwood and smaller trees, opportunities for thinning release, improvement cuts, and other forms of intermediate stand management have increased. Nevertheless, the practices result in higher wood harvest costs than regeneration clearcuts, and are only justifiable economically in selected situations. More research is needed to enable foresters to advise landowners where these situations exist and how best to fit them into management plans. This project would be closely related to No. 6 on equipment development, and implementing its results probably require the enhanced delivery systems sought in No. 4.

10. Evaluate Alternative Arrangements for Leasing Timber Growing Rights on Non-Industrial Forests.

There is already much experience with such leases by wood-using industries. Some foresters feel that, with more research into a variety of payment, technical control, and regeneration arrangements, the complex process of intensive management may be transferred to a trained and well-equipped forestry organization while the owner retains his basic property rights and a guaranteed fair income from a much augmented timber flow. Others feel no further research is needed to implement this process. Where multiple uses are desired by owners who place high non-commodity values on the forest, more complex lease administration would be required.

11. The Effect of Changes in Timber Output on Local Economies. (Develop an econometric model to measure the impact of changes in timber output on income and employment in existing or potential local wood-using firms and the related economy.)

Even where wood supplies may have little impact in a regional or national market, they may be crucial to a local economy built around wood processing. These can be the principal means of capital formation in some communities, as well as the major employer. A public policy and industrial initiative for intensive management in these areas may be justifiable, but research to demonstrate the prospective costs and returns has not been done. On the other hand long-term retention of labor in low productivity work may be difficult and socially questionable.

12. Pest Management. (Develop thinning and other integrated pest management strategies to reduce risk of insect and disease infestation on small tracts.)

Such pests as the southern pine bark beetle and fusiform rust have imposed large losses on southern forests, so large that many non-industrial owners are reluctant to make further investments in increased forest production. Research must devise and demonstrate control measures that are effective, less costly, and that can be combined with other silvicultural practices whenever possible.

Nevertheless the Technical Review Panel felt that extensive research in this subject is already underway and that priority for scarce forestry research resources should be placed elsewhere at the present time.

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APPENDIX A

Review Panel

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APPENDIX B

Forest Research and Development Projects Applicable to the Small Landowners in Southeastern United States

On the right are noted institutions where this problem analysis found records of a current or recent research project.

A. Regeneration

1. Site Preparation and Maintenance - Pine

Development of direct seeded loblolly stands in the Piedmont	U of GA, VDF
Effects of soil conditioning on growth of loblolly pine in eroded soil in the Piedmont region	Clemson
Intensive site preparation effects on site index and survival of loblolly pine in Georgia Piedmont	U of GA
Regeneration alternatives	NCSU
Site preparation and early vegetation control in pine plantations	U of GA USFS-SO Stn.
Site preparation effectiveness for loblolly pine in the hilly Coastal Plain of Alabama	Auburn U
Testing lower cost site preparation equipment, especially for patch or strip site preparation, with comparative cost analyses.	
Vendor availability	

2. Stand Establishment by Planting	
Planting methods related to site condition, survival and growth expectations	
Seedling availability, handling and storage	
3. Direct Seeding	
Seedling establishment success and distribution	
Source of seed	
4. Natural Regeneration - Pine	
Effects of prescribed fire on water quality and its potential as a site preparation treatment for natural regeneration in the Piedmont	Clemson U
Gradual stand conversion from hardwood to pine utilizing a light hardwood overstory	Clemson U
Loblolly pine management research and development	USFS-SE Stn.
Seedbed density and its effect on growth of pine after 15 years	Clemson U
Uneven-aged management for small forest properties	USFS-SO Stn.
B. Intermediate Stand Management	
1. Thinning and spacing	
Commercial thinning, relations to methods, equipment and markets	
Effect of thinning on stem form and wood quality of loblolly pine in Piedmont	Clemson U
Intermediate thinning	NCSU
Loblolly pine management R & D program, stand establishment and stand management projects	USFS-SE Stn., VDF

Pre commercial thinning	
Residual stocking levels	
2. Vegetation Control	
Auburn University forestry chemicals co-op	Auburn U
Control of undesirable vegetation in southern pine and upland hardwood forest	USFS-SO Stn., VDF
Effects of thinning on stem form and wood quality of loblolly pine in the upper piedmont	Clemson U
Enhancement and maintenance of forest site productivity	NCSU
Evaluation of Roundup^{R} for weed control	Clemson U, VDF
Evaluation of Velpar^{R}	NCSU, VDF
Fertilization and nutrition of southern pine	U of FL, NCSU
Field screening of herbicides - rates, concentration effects on target species	VDF
Loblolly pine management R & D program, stand establishment project	USFS-SE Stn
Regeneration and intensive management of pines in the southern piedmont	VPI & SU
Research project in use of herbicides	U of GA, VDF
The influence of herbicides on different species of herbaceous weeds in loblolly pine forest	LSU
Thinning, burning and fertilization experiments with coastal plain southern pines	Clemson U

3. Fire	
Fire science project	USFS-SE Stn.
Prescribed fire and its potential as a site preparation treatment for natural regeneration	Clemson U, VDF
Prescribed fire for site preparation productivity	U of TN, VDF
Smoke management guidelines/programs	USFS, VDF
4. Other Cultural Methods and Effects	
Development of loblolly pine as affected by early cultural treatments	LSU
Effects of mechanical site preparation on height growth in loblolly pine plantations	Texas A & M
Silviculture of pine and hardwood stands in Georgia	U of GA
Silviculture of southern pines in the West Gulf Coastal Plain	USFS-SO Stn.
Special studies of loblolly pine and wetland hardwoods	USFS-SE Stn.
The influence of competition from hardwoods and non-woody vegetation on growth of loblolly pine	LSU, VDF
C. Forest Protection	
1. Forest Insects	
Detection, evaluation, and control of damaging Southeastern forest insects	USFS-SE Stn., VDF

Expanded Forest Pest Management System (ESPBRAP)	USFS
Integrated Forest Pest Management System (IFPM)	USFS, VDF
The biology and control of bark beetles	Southwide
Thinning practices and associated pest problems in southern pines	MS State
2. Forest Diseases	
Ecology and control of fusiform rust on southern pines	USDA-SEA
Fomes annosus control	VPI & SU
D. Forest Engineering and Harvesting	
1. Special Logging Equipment	
Develop a prototype unmanned tree planter	NCSU
Evaluation of severance devices and methods for small diameter stems	VPI & SU
Logging equipment for small tracts	
Performance characteristics of a small four-wheel drive logging tractor	USFS-SO Stn.
2. Logging System Studies	
Adaptation of conventional and novel harvesting systems to changing southern forest conditions	VPI & SU, NCSU
Engineering systems for intensive forest management	Auburn U
Interaction with site preparation and regeneration	VPI & SU
Row versus selective thinning in slash and loblolly pine plantations	U of GA

Soil compaction by harvesting machinery while thinning plantations	USFS-SO Stn
Timber harvesting development-systems, energy requirements, and equipment modification	MSU
Time and production studies of feller-bunchers	Auburn U
3. Biomass Harvesting	
Evaluation of harvesting systems for residue recovery	VPI & SU
The use of understory vegetation as a renewable biomass energy resource	U of Arkansas
Wood for energy research	GA For. Comm.
E. Economics of Non-Industrial Private Woodlands	
1. Management of Single Tracts	
Accounting methods for small forest ownerships	
Allocation of inputs among forest management opportunities	U of Mo.
Development of a management plan for small acreages of non-industrial forest land	North La. Hill Farm Stn.
Economic comparison of regeneration systems on non-industrial private woodlands	NCSU
Economic feasibility of investing in pulpwood and timber production in Louisiana	LSU
Economics of intensive pine management in the Southeast	VPI & SU
Economic opportunities and constraints to improving productivity on private non-industrial forests	MS State

Management alternatives on private (non-industrial) lands	NCSU
2. Landowner Attitudes	
Attitudes and forest practices of private non-industrial forest landowners in Arkansas	U of Arkansas
Attitudes and reactions of landowners to alternative public incentive systems	
Attitudes of private non-industrial forest landowners toward multiple resource management in Mississippi	MS State
Characteristics of landowners in private forest management incentives programs in South Carolina	Clemson U
Effectiveness of technical information delivery systems	
Forest management and marketing practices	Oklahoma State, NCSU
Forest products supply behavior of private woodland owners in Maryland	U of Maryland
Timber availability from private non-industrial forest lands in Louisiana	Louisiana Tech
Perceptions of the visual impacts of eastern hardwood management	VPI & SU
3. Public Policies	
A research problem analysis of the non-industrial private forest landowners in South Caroina	Clemson U

Economics of labor use in forestry	NCSU
Estate planning alternatives for transferring ownership of private, non-industrial forest property	Oregon S
Forest land valuation	NCSU
Land use in southeastern U.S. forestry: a problem analysis	VPI & SU
Leasing arrangements for small tracts	LSU
Local economy effects from changes in timber output	
Potential softwood availability from Miss. Forests	MS State
Timber and timberland income taxation	NCSU, VPI & SU
Timber supply from non-industrial private holdings	VPI & SU