



Nonindustrial Private Forestry

An Agenda for Economic and Policy Research

Compiled by

Paul V. Ellefson

Melvin D. Bellinger

Bernard J. Lewis



Station Bulletin 592-1990 (Item No. AD-SB-3894)

Minnesota Agricultural Experiment Station

University of Minnesota

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NONINDUSTRIAL PRIVATE FORESTRY: AN AGENDA FOR ECONOMIC AND POLICY RESEARCH

Compiled by Paul V. Ellefson, Melvin D. Bellinger and Bernard J. Lewis

Executive Summary

Nonindustrial private forests are an important part of the nation's forest land base. They occupy over 276 million acres of land and are owned by more than seven million individuals. Nonindustrial private forests are major contributors to the economic and social well-being of the nation. They are the source of over half the nation's roundwood timber supplies and make significant contributions to the production of water, wildlife, recreation, aesthetics and environmental quality.

Nonindustrial private forests appear to have the potential to make even greater contributions in an economically, socially, and environmentally acceptable fashion. Unfortunately, such potentials cannot be realized without significant attention by the forestry and natural resources research community, especially attention directed to improving the availability of economic and policy information. A clearly defined research agenda that focuses on priority problems and issues, can provide significant guidance to resolving many of the potential deterrents that inhibit greater contributions by nonindustrial private forests.

In consultation with foresters, policy analysts and program administrators from private, government and academic sectors, eleven issue areas have been judged to need a priority in the focus of future research and study:

- **Public versus private sector roles in the management of nonindustrial private forests.** Increases in the management of nonindustrial private forests can be fostered by both public and private sector actions. By determining the appropriate mix of public and private programs, nonindustrial private forests are more likely to receive appropriate combinations of inputs necessary to produce the level of goods and services desired of them in the future.
- **Broadly scoped, nonforestry public programs and the management of nonindustrial private forests.** Numerous laws and public programs not primarily directed at forestry, can nevertheless detract from or facilitate the management of nonindustrial private forests. If the impacts of such laws and programs are better understood, their beneficial as well as adverse effects can be dealt with more directly.
- **Public forestry assistance and the management of nonindustrial private forests.** Public forestry programs provide owners of nonindustrial private forests with professional, technical, and financial assistance. If changes in forest management resulting from such assistance are better understood, the efficiency, effectiveness and management of such programs can be strengthened.

- **Institutional and organizational arrangements for encouraging management of nonindustrial private forests.** Banking, credit, marketing, suppliers, cooperatives and government programs all have structures and operating rules that influence the way owners of nonindustrial private forests use and manage their forests. If better understood, such arrangements can be modified to attain more desired levels of forest management.
 - **Community and regional economic development as a focus for management of nonindustrial private forests.** Nonindustrial private forests are often a major component of a community's or a region's potential development base. Understanding that potential, and how it can be activated, can facilitate successful accomplishment of local and regional economic development projects.
 - **Multiple goods and services as a focus for management of nonindustrial private forests.** Nonindustrial private forests are capable of producing multiple outputs. By determining the costs and benefits associated with the management of such outputs, and how private owners might receive value for them, a greater range and magnitude of benefits can possibly be produced by such forests.
 - **Environmental quality and the management of nonindustrial private forests.** Increasingly the public is concerned about the quality of forest management applied to nonindustrial private forest lands. Specific evaluation of the full range of positive and negative effects of such management can result in approaches that are more socially acceptable.
 - **Fragmentation and ownership changes affecting management of nonindustrial private forests.** As nonindustrial private forests are bought and sold, changes occur in tract size and owner ascribed objectives. By determining the impact of these changes on ownership objectives, production costs, and availability for timber harvest, the impact of fragmentation and ownership turnover on potential levels of production can be dealt with.
 - **Professional forestry assistance and the management of nonindustrial private forests.** The extent to which intensive forest management practices are applied to nonindustrial private forests is very sensitive to the use of forestry information and the advice of professional foresters. Increasing the use of forestry assistance necessitates full evaluation of the professional forester's role in private land management.
 - **Extensive forestry applied to management of nonindustrial private forests.** Low cost and low impact forest management is emerging as a promising method of forest management for nonindustrial private forests. The approach deserves a comprehensive evaluation.
 - **Forest inventory information affecting management of nonindustrial private forests.** National, regional and local knowledge of the quality and quantity of forest goods and services is necessary for both public and private planning. Increased accuracy is required for a wider range of goods and services, across a wider range of local and regional bases.
- Strategic research directions within each issue area are identified in the full report. Specific studies to be undertaken within these strategies require further consultation between researchers, administrators and owners of nonindustrial private forests.
- Generally available are the talent, tools, and institutional structure required for supporting a research program focused on economic and policy issues of nonindustrial private forests. Needed, however, is a financial commitment that will enable the forestry research community to proceed with the tasks. The agenda identified is sufficient to require the talents of all segments of the forestry community, including universities, federal and state governments, and private organizations.
- The investment in the agenda presented here should be commensurate with the expected value of the goods and services that will be added by the application of the newly generated knowledge. A first estimate calls for about an additional \$700,000 annually to be devoted to this effort.

Significance of Nonindustrial Private Forests _____

Private individuals and organizations other than those traditionally recognized as the forest industry own nearly three fifths or 276.5 million acres of the nation's timberland. These are collectively known as nonindustrial private forests. Their owners total over seven million in number and are responsible for nearly half the timber harvested from forests across the nation.

Of the nonindustrial private forests, 70 percent are less than 10 acres in size, although holdings of such size account for only 3 percent of the nation's total privately owned timberland. Nonindustrial private owners of forests are a heterogeneous lot, with forestry interests ranging from recreation and wildlife to timber and scenic beauty.

Nonindustrial private forests are often considered extremely important to increasing the nation's future supply of timber. They account for a significant proportion of both the nation's timberland and growing stock. They also represent economic opportunities worthy of serious consideration. A recent nationwide assessment of the nation's renewable forest resources states ". . . it is clear that substantial opportunities to increase timber productivity on other [nonindustrial] private lands exist today.

These investments, if made, would generate significant increases in timber growth at a favorable rate of return."¹

The array of ownership and institutional circumstances significantly challenge capturing the many opportunities represented by nonindustrial private forests. That array ranges from landowner concerns over risk, uncertainty and capital requirements, to public sector apprehension over appropriate mixes of educational, financial, tax and regulatory programs.

These concerns imply a plethora of unknowns and information voids which detract from the ability of nonindustrial private forests to make even greater contributions to the nation's social and economic fabric. Such concerns deserve significant research attention, especially research involving economic and policy sciences.

¹ An Analysis of the Timber Situation in the United States 1989-2040. Part II: The Future Resource Situation. A Technical Document Supporting the 1989 RPA Assessment. Forest Service. U.S. Department of Agriculture. Washington, DC, 1989. Page 9-46.

Nonindustrial Private Forestry as a System _____

Nonindustrial private forestry encompasses a broad range of natural and social phenomena including land and natural resources, individuals and organizations, governments and markets, and institutions and values. Understanding this complex arena requires using both natural and social sciences. The former can reflect forestry's focus on the biophysical processes of forest ecosystems (e.g., natural processes involving regeneration and growth of vegetation), while the latter reflect human activities which influence such systems.

Spatial dimensions are also important to understanding nonindustrial private forestry, in that concern can center on individual landowners and the nature of a specific forested tract, or on aggregate regional and national patterns of land ownership and resource characteristics. In a similar vein, public programs aimed at enhancing productivity of nonindustrial private forests can be viewed either in terms of impacts on individual forest land owners, or on the economies of localities, regions, and the nation as a whole. Time frames for such

considerations may be static or dynamic, short or long-term in nature.

Nonindustrial private forests may be subjected to a variety of management activities (i.e., intentional actions by owners to influence natural processes inherent in their forests for the purpose of producing certain kinds of outputs). These activities may lead to a variety of outputs, including timber and related wood products, recreational and aesthetic experiences, wildlife and plant communities, productive and stable soils and the flow of significant quantities of high quality water. Properly applied, forest management activities will ultimately contribute to the well-being of society and to the quality of natural environments.

The motives and rationales for owning nonindustrial private forests are highly variable. Some owners engage in varying degrees of active management, while others prefer to maintain their forests in an undisturbed state. From an aggregate perspective, the nature of nonindustrial private forestry is that of a process. It is a process in which diverse forest land owners make decisions about a particular component of a region's forest land base. And it is a process where these decisions affect both the physical status of the land base, and its contributions to economic development and the quality of life in a particular geographic area.

In addition to the activities of individual owners, nonindustrial private forestry encompasses other areas of social action. Via a variety of public programs, information and incentives are provided to encourage owners to manage their forests for various goods and services. These programs are often embedded within a plethora of public policies which, while not all focused directly on nonindustrial private forests, may nonetheless affect the inclination

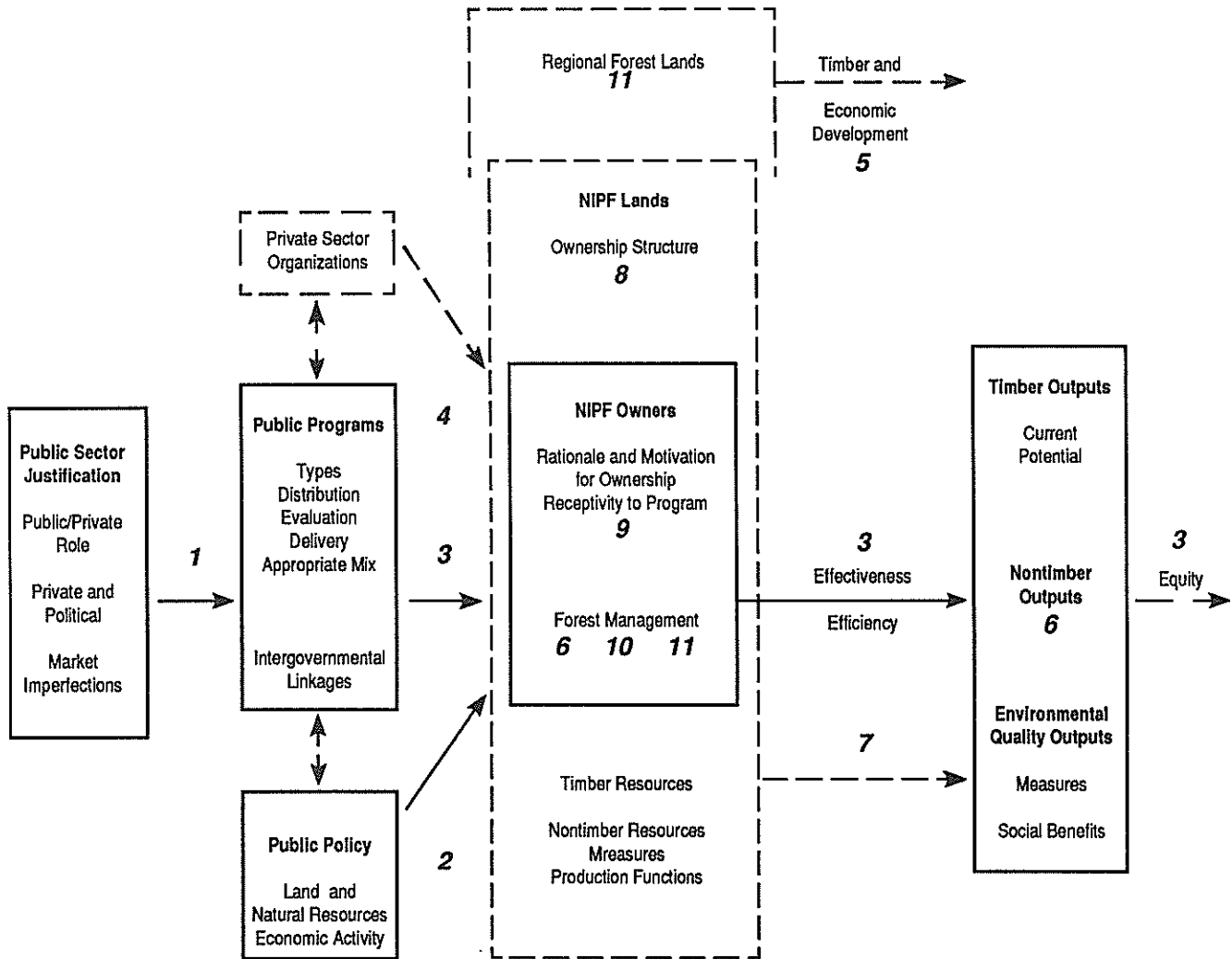
of owners to engage in some form of active forest management.

The question of whether public efforts to influence the course of nonindustrial private forest management are necessary or desirable is an important concern. Typically, justification for public (i.e., government) action is brought about after substantial discussion and debate. An important aspect of such discussion is the role of organizational arrangements and incentives provided by the private sector as an alternative or complement to government action.

Research efforts focused on nonindustrial private forestry can be concentrated on any number of important issues and can consist of an even greater number of strategic directions within any one issue area. Guided by the framework depicted in Figure 1, twelve issues have been identified as important topics for future research concerning nonindustrial private forests.³ What follows is a focused review of each issue and a listing of example strategic directions for future research. Following discussion of all issues, research priorities and necessary institutional and financial support to implement the research agenda are presented.

³ The issues are reflective of intense discussions which occurred during a two-day workshop (April 1989) involving program administrators and policy and program analysts having a variety of experiences with nonindustrial private forestry programs. The workshop was organized by State and Private Forestry, USDA-Forest Service, Washington, DC and the Department of Forest Resources, University of Minnesota, St. Paul, MN. The workshop participants included: Melvin D. Bellinger, Frederick C. Cabbage, Fred Deneke, George Dutrow, Paul V. Ellefson, Perry R. Hagenstein, H. Fred Kaiser, Jr., W. David Klemperer, Robert Moulton, Allen J. Schacht, Jeffrey C. Stier and Lawrence D. Teeter.

Figure 1: Framework for discussion of economic and policy information issues concerning nonindustrial private forests.



Issue Key

- 1: Public Versus Private Sector Roles in the Management of Nonindustrial Private Forests
- 2: Broadly Scoped Nonforestry Public Programs and the Management of Nonindustrial Private Forests
- 3: Public Forestry Assistance and the Management of Nonindustrial Private Forests
- 4: Institutional and Organizational Arrangements for Encouraging Management of Nonindustrial Private Forests
- 5: Community and Economic Development as a Focus For Management of Nonindustrial Private Forests
- 6: Multiple Goods and Services as a Focus for Management of Nonindustrial Private Forests
- 7: Environmental Quality and the Management of Nonindustrial Private Forests
- 8: Fragmentation and Ownership Changes Affecting Management of Nonindustrial Private Forests
- 9: Professional Forestry Assistance and the Management of Nonindustrial Private Forests
- 10: Extensive Forestry Applied to Management of Nonindustrial Private Forests
- 11: Forest Inventory Information Affecting Management of Nonindustrial Private Forests

ISSUE: Public Versus Private Sector Roles in the Management of Nonindustrial Private Forests

ISSUE SUMMARY

A basic premise underlying public programs for nonindustrial private forestry has two facets. One is that such programs provide owners with forestry information and incentives that they would not otherwise receive. The other is that they would receive such information in a form that is incomplete or ambiguous in nature.

Regardless of the information content or assistance provided, public programs for private forestry have costs that must be borne by society. If these costs exceed the social benefits to be derived from such programs, justification for government action becomes difficult. Given the changing nature of natural and social environments within which justification discussions are undertaken, a continuing dialogue is essential to ensure that public roles in nonindustrial private forestry rest on solid ground.

Conventional wisdom in capitalistic societies holds that if private markets are able to efficiently allocate socially desirable outputs, then they should be allowed to do so without government interference. The inability of markets to do so, however, becomes a rationale or justification for government action.

Government actions are presumed to correct for market deficiencies. Accordingly, justification for the public role in nonindustrial private forestry requires examining the degree to which market mechanisms efficiently allocate socially desirable outputs from nonindustrial private forests. It also requires identifying those areas in which markets do not achieve this function. The latter may result from the nature of the outputs involved (e.g. public goods which no market can conceivably supply); the generation of undesirable side effects (i.e., externalities); imperfect knowledge among market participants; or imperfections in competitive market structures (i.e., barriers to entry and exit). The extent to which any of these situations occur may serve as a reason



for public intervention in markets for outputs from nonindustrial private forests.

Justification for a public role in nonindustrial private forestry also requires examining the performance of remedial measures undertaken by government (e.g., financial incentives, technical information). Focus must be on the effectiveness with which socially desirable outputs from private forest lands (and inputs to owners) are generated via government action, and the efficiency of programs and policies used to attain such ends. Interest may be in the design of innovative remedies that are less intrusive to the market than large scale government involvement (e.g., facilitating consulting forestry community, encouraging forestry cooperatives).

DIRECTIONS FOR FUTURE RESEARCH

□ Evaluate the effectiveness of competitive market structures in stimulating (without government intervention) the production of optimal types and amounts of forest outputs from nonindustrial private forests. Assess the degree to which landowner or associated private sector arrangements (e.g., wood-based industry, cooperatives, consultants) stimulate the application of management practices to nonindustrial private forests. Examine the extent to which such arrangements are stimulated by rising prices.

□ Analyze the extent to which different types of market imperfections (i.e., externalities, imperfect competition, existence of public goods) occur within the nonindustrial private forestry sector.

— Assess the extent to which timber pricing structures and relatively inelastic timber supply functions are true market failures which prevent markets from reaching a welfare maximum.

— With respect to individual forest land owners, consider the extent to which inadequate information can be attributed to market failure.

— Determine the degree to which income distributions complicate the above analyses.

□ For market imperfections identified, determine the types of government actions that are likely to improve welfare (i.e., those in which anticipated net social benefits would exceed the cost of government programs). Consider a full range of alternatives (i.e., direct subsidies, tax subsidies, technical assistance, forest practice regulations).

□ Identify laws, regulations and policies pertaining to the status and management of nonindustrial private forests. Systematically examine the justification for their existence and identify inconsistencies in terms of both underlying rationale and practical application.

□ On the basis of analyses such as the above, determine the most acceptable *combinations* of government actions and market mechanisms to be focused on the nonindustrial private forestry sector. Include both justificatory rationales and practical mechanisms (including evaluation criteria and evidence from existing analyses) for the particular mix of activities and processes identified.

ISSUE: Broadly Scoped Nonforestry Public Programs and the Management of Nonindustrial Private Forests

ISSUE SUMMARY

In addition to public programs specifically designed to provide assistance to nonindustrial private owners of forests, a wide variety of other laws, regulations and policies may influence owner decisions to invest in forest management activities. Of concern are public policies focused on land and natural resources in general (e.g., air and water quality, endangered species) and public policies addressing broad economic and social concerns which are of interest to virtually all segments of society (e.g., tax policies).

Growth in the number and scope of public policies focusing on land and natural resources reflect societal concern over changing land use patterns and general anxiety over the quality of natural environments. Such policies pose definite implications for the use and management of nonindustrial private forests.

For example, attempts to preserve specific kinds of natural resources associated with forests (e.g., wildlife) often have direct impacts on the range of management practices available for application to nonindustrial private forests. Similarly, expansion of urban infrastructures into rural areas often results in land use controls (e.g., zoning, comprehensive land use planning) which limit the uses to which nonindustrial private forests can be put. And the policies and practices of adjacent public land-owning agencies (federal, state and local) can often pose less than desirable consequences for the management of nonindustrial private forests and the marketing of products from them.

In a slightly different vein, gradual alteration of agricultural production policies in response to the need for fewer acres of certain types of agricultural land enhances the competitive status of forestry as an alternative to agricultural uses of land—land becomes available for forestry uses. These factors have implications for the range of management

alternatives and the feasibility of various investment options available to owners of nonindustrial private forests.

Public policy not specifically concerned with land and natural resources also poses consequences for owners of nonindustrial private forests. In the area of tax policy, for example, the manner in which capital gains are treated has direct implications for the type and magnitude of investments made in nonindustrial private forests. Similarly, trade policies which define the accessibility of markets for various kinds of wood products can be important considerations when assessing investment opportunities in such forests. The consequences of these and related areas of broadly defined public policy will be reflected in the ownership structure of nonindustrial private forests and in the outputs of goods and services resulting from owners' decisions to invest in forest management.

DIRECTIONS FOR FUTURE RESEARCH

- Assess the effectiveness and efficiency of state and local regulatory laws as means of encouraging the management of nonindustrial private forests and as means of enhancing the productivity of nonindustrial private forests for uses in addition to timber production.
- Identify and assess the nonindustrial forest management effects of federal and state efforts to protect specific natural resources from degradation (e.g., ground and surface waters, endangered species of plants and animals).
- Examine the impact of various forms of state and local government zoning and land use regulations on the ownership of nonindustrial private forests in different localities and regions, and on the resultant patterns of forest management investments (including



of nonindustrial private owners of forests to access markets and on their ability and willingness to invest in forest management practices. Examine the effects on nonindustrial private forestry of public policies designed to shift the production of timber and other marketable commodities (e.g., grazing, intensive recreation) from public to private forests.

- Assess the impact of changing agriculture structures on the status and management of nonindustrial private forests. Consider the status of forestry as a form of low-input sustainable agriculture. Refine capabilities for projecting relationships between agricultural and forest land uses.
- Analyze present and potential effects of alternative tax structures (federal and state level) on the productivity of nonindustrial private forests. Quantify the effects of capital gains measures on the adoption of such management activities as reforestation and timber stand improvement. Examine the implications of passive loss rules for timber management on private lands.
- Examine the impact of federal trade policies and regulations on the productivity of nonindustrial private forest lands. Delineate linkages between policies affecting timber and wood product exports, imports, product standards, and other trade-related variables on market structures for outputs from nonindustrial private forests. Consider the effectiveness of such policies in providing market opportunities or in erecting market barriers for timber production on private forest lands.

types and levels of outputs generated).

- Identify and assess the impact of policies and practices of public land-owning agencies (federal, state and local) on the management of nonindustrial private forests. Consider such factors as the effects of public agency timber sale procedures (e.g., bidding procedures, stumpage pricing, contract formulation and administration) on the ability

ISSUE: Public Forestry Assistance and the Management of Nonindustrial Private Forests

ISSUE SUMMARY

A variety of public programs are focused on nonindustrial private forests. They are designed to provide landowners with information or assistance that will facilitate management actions leading to the production of greater quantities and varieties of outputs in an environmentally sensitive manner.

Information provided owners via public programs varies from technical advice supplied by professional foresters to descriptions of potential forest outputs, appropriate management techniques, and possible investment strategies as made available via published reports or educational seminars. Financial assistance may take the form of direct incentives (e.g., cost share of forest management activities) or indirect incentives (e.g., tax reductions).

Public programs for nonindustrial private forestry stimulate the production of outputs that benefit individual landowners as well as society in general. Returns from the sale of timber and other marketable goods and services, and the satisfaction derived from aesthetic and other amenities associated with forests, may be of great importance to individual owners. At the same time, such outputs contribute to enhanced economic activity and to the stability of the forest land base within a particular locale or region.

Continuing assessment of the economic and social consequences of public assistance programs encourages gains in effectiveness, efficiency and benefit (or cost) distributions. Evaluation of program effectiveness concerns the acceptability of output types and levels (individual and societal perspective) resulting from public investments in nonindustrial forests, while efficiency evaluation relates output levels to the cost of producing such outputs. Equity assessment focuses on the distribution effects of landowner assistance in terms of who benefits and who pays (individually and regionally).

The comparative performance of different programs, when judged in light of these criteria, enables identification of the appropriate mix of

programs—the mix most likely to yield the highest level of net benefits in a particular locality or region. The development and refinement of methods that incorporate all of these key dimensions of program assessment and evaluation remain an important focus of research in the area of nonindustrial private forestry.

DIRECTIONS FOR FUTURE RESEARCH

- Systematically document existing public programs that provide assistance to nonindustrial private forest land owners in terms of program type, agency or organization involvement, and character of owners and ownerships receiving assistance. Program types, for example, should include service forestry, extension forestry, utilization and marketing, price reporting services, cost sharing, tax incentives and forest protection (fire, insects and diseases). Documentation should entail information on program content and authority, administering agency, resource investment levels, program output levels, evaluation criteria (efficiency, effectiveness, equity), and program mix (individual organizational and inter-organizational).
- Continue to refine the content of programs providing information to private forest owners so as to increase both accuracy and efficiency of presentation as well as the likelihood that owners will utilize such information in a manner that will further accomplishment of program objectives. Key areas of program content and supporting analyses are:

Technical Information

— Timber management: regeneration options, noncommercial treatments, thinning regimes, timber stand improvement, harvesting options, extensive versus intensive management techniques, forest insect and disease problems (recognition and protective actions).

— Multiple use management strategies: timber management for habitat development and species diversity; soil and water conservation through forest management techniques.

Investment information

— Timber management: yields, future prices, future public policies potentially impacting timber investments (e.g., regulations, tax laws), and returns on timberland investments (stumpage price and management cost projections, levels of investment required to yield reasonable profits, opportunities for increased investments, risk and uncertainty aspects of timber investments).

— Multiple use management: profitability of innovative enterprises using forest-based resources (e.g., hunting leases, specialty trees or crops, home crafts).

Marketing information

— Efficiency of alternative systems for wood procurement; marketing strategies for uncertain environments.

□ Assess the effectiveness and efficiency of different types of public assistance programs (including tax subsidies) in fostering investments on nonindustrial private forest lands.

— Monitor induced investments as reflected by effects on capital substitution, returns from timber harvesting and type and extent of management practices (e.g., retention and condition of plantings, timber stand improvement accomplishments, thinnings, other follow-up treatments).

— Evaluate the relative effectiveness of various forms of technical assistance, direct subsidies, and alternative tax policies (e.g., yield taxes, reforestation tax credits, amortization provisions) as related to owner and ownership characteristics.

— Relate outputs of various types of programs to costs of provision (efficiency analyses) and alternative forms of delivery.

— Assess the effectiveness and efficiency of public programs for protecting forests from fire, insects and diseases, with specific consideration of key aspects such as thresholds for taking action and damage appraisal procedures.

□ With respect to assessing the effectiveness and efficiency of different types of public assistance programs, provide for more refined statistical and econometric analyses (incorporating objective data both time series and cross-sectional in nature) that test the statistical significance of a policy's ability to influence various management actions undertaken on nonindustrial private forest lands. Such will also aid assessment of the aggregate effects of policies and programs in terms of regional forest land stability and economic development.

□ Examine the equity consequences of public programs for nonindustrial private forestry.

— Assemble and analyze data on direct benefits (services and payments) to individual forest land owners according to incomes and assets, and assess expected returns from services and payments provided by public investments in light of such distributions.

— Assemble and analyze data on benefits to local and regional forest economies according to income and assets. Include secondary benefits experienced at local or regional levels (e.g., increased employment opportunities generated by program implementation); and enhanced community and economic development in localities and regions (resulting from employment gains and increases in availability of wood fiber and other forest-based goods and services).

— Examine relationships between benefits (individual and aggregate levels) and program costs as reflected in distribution of tax burdens across individuals and local, substate and regional areas.

ISSUE: Institutional and Organizational Arrangements for Encouraging Management of Nonindustrial Private Forests

ISSUE SUMMARY

A variety of institutional and organizational arrangements exist for the provision of technical and financial assistance to owners of nonindustrial private forest lands. Public programs may be administered by federal, state or local natural resource agencies, with federal assistance frequently mediated through state forestry programs. In the private sector, wood based industries, management and marketing cooperatives, landowner associations, and forestry consulting services provide additional sources of assistance for forest land owners. The arrangements through which such services are provided (both individually and in combination) may have a major bearing on the efficiency and effectiveness of such efforts in stimulating enhanced forest management practices on nonindustrial private forest lands.

Program delivery is an important component of the overall efficiency of forestry assistance activities of public agencies. In this regard, staffing shortages, delays arising from bureaucratic red tape, and other factors may discourage forest land owners from seeking professional assistance in managing their forests. In the private sector, organizations such as cooperatives and landowner associations may lack the resources or information dissemination capabilities to reach the number of forest land owners who might avail themselves of the services such organizations provide.

Duplication and overlap of services provided by different agencies and organizations may also contribute to a collective misallocation of resources; or to reductions in aggregate effectiveness in terms of actual versus potential numbers of forest land owners to whom assistance is provided.

There is a need for maintaining a comprehensive perspective within which to evaluate existing and potential arrangements for the delivery of services to owners of nonindustrial private forest lands. Such a framework requires documenting

the organizations currently providing assistance to landowners; the range of services offered by each source; the degree of organizational specialization in particular services; recipients of assistance; program costs; and overall visibility of organizational efforts in program delivery.

In the public sector, intergovernmental linkages and administrative arrangements for program delivery are an important concern, particularly in light of the recent trend towards reducing the federal role in many areas of state-level public policy. Such a framework would provide a basis for defining the optimum mix of organizational inputs for the delivery of different types of assistance to private forest land owners.

The process of doing so would enhance aggregate efficiency and effectiveness through the reduction of program duplication and overlap. At the same time, individual organizations in both public and private sectors would be better able to define their role in providing appropriate mix of programs that would maximize overall efficiency and effectiveness.

DIRECTIONS FOR FUTURE RESEARCH

- Identify public and private organizations that provide assistance to owners of nonindustrial private forest lands. As an input to key evaluation criteria, characterize the efficiency and effectiveness of organizational delivery systems in terms of organization size, degree of specialization in relation to scope of programs delivered, response time, and program and organization visibility. Relate these considerations to the determination of appropriate mixes of programs for particular organizations.
- Determine the degree of duplication of services by different organizations in the delivery of programs for nonindustrial private forestry. Identify the degree of overlap among the recipients of programs delivered by



different organizations. Use such information to characterize optimum network size (in terms of organization mix and extent of participation) for delivering various kinds of assistance to private forest land owners.

- Examine the interrelationships of federal, state and local agencies involved in providing assistance to owners of nonindustrial private forest lands.

- Identify the funding levels and arrangements through which programs are supported and implemented across different levels of government (i.e., federal to state, state to local).

- Delineate the content and patterns of information flows among agencies involved in programs for nonindustrial private forestry at various levels of government and the impacts of such flows on program structure and implementation and on evaluation of program results.

- Assess the effects of declining federal budgets on state programs for nonindustrial private forestry. Evaluate consequences in terms of changes in absolute and relative budgets for state programs; impacts on the effectiveness and efficiency of state programs involving the use of federal funds (e.g., cost sharing, fire suppression, marketing information services, etc.); and equity implications for targeting state forestry assistance.

- Examine various arrangements linking owners of nonindustrial private forests with private sector organizations in terms of the effects of such relationships on forest land management and productivity. Liberally employ case study techniques.

- Identify the form and extent of contractual arrangements between forest land owners and wood-based industries and assess resultant impacts on forest land productivity.

- Assess the nature and performance of management and marketing cooperatives for nonindustrial forest land owners and identify factors important to the economic and administrative feasibility of such arrangements.

- Examine the role of landowner associations in the encouraging management practices on nonindustrial private lands.

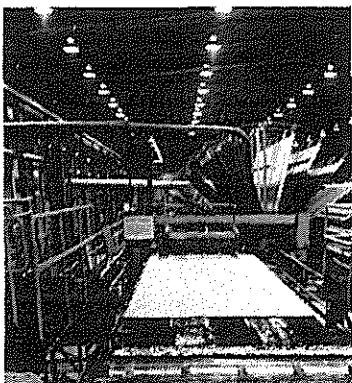
- Identify potential means of facilitating the establishment and availability of private consulting services for nonindustrial forest land owners.

- Identify sources of capital for nonindustrial private forestry (e.g., banks, pension funds) and the capital allocation practices of such institutions.

- Use information from the above items in specifying organizational networks for delivering assistance to owners of nonindustrial private forest lands in particular geographic localities or regions. Consider the attributes of individual public and private organizations (e.g., human, financial and information resources), and the matching of program content to organizational expertise and delivery capabilities. Specify linkages among organizations, in terms of flows of information and support, that will facilitate cooperation and enhance efficiency via complementary, as opposed to duplicated program delivery.

ISSUE: Community and Economic Development as a Focus For Management of Nonindustrial Private Forests

ISSUE SUMMARY



Within a particular geographic region, nonindustrial private forests are often a significant portion of the forest land base on which the economic stability and growth of communities and regions depends. The links between timber availability from nonindustrial private lands and regional economic development are numerous and complex. Local purchasing and processing of raw materials by wood-based firms can generate significant immediate income and employment effects in local communities; while secondary and tertiary processing by wood products firms can generate additional effects which reverberate throughout local and regional economies.

Central to the entire process is the ability of a region's wood-based industry to transform timber resources into value-added exports. Strengthening a region's timber-based sector, including the nonindustrial private component, can be an important strategy for local and regional economic development.

Economic development strategies imply recognition of at least two major components. First, availability of timber is critical to the decisions of wood-based firms to locate or expand processing facilities in a particular region. As such, programs to foster stable timber inventories of marketable species are likely to encourage firms to locate in areas where supplies are accessible. The market impacts of new firms in a region may well provide added incentives for owners of nonindustrial private forest lands to invest in timber production.

Second, linkages must be demonstrated between timber availability, wood-based industrial structure, broader economic structures of a particular region, and extra-regional markets. Specifying the relatively high

export-based multiplier effects of wood products industries within given regions is one important step toward understanding those links. Such information is important to developing alternative regional and community futures--scenarios of the future which are consistent with regional and community resource and economic constraints.

DIRECTIONS FOR FUTURE RESEARCH

- Develop and refine understanding of the nature and structure of regional economic systems involving nonindustrial private forests.

- Construct a generalized framework, within which to analyze the role of nonindustrial private forests in basic economic processes, specified in terms that can be related to output, income, employment, final demands, investment and primary inputs.

- Incorporate broader social variables related to labor force characteristics and population change (e.g., migration) within the above framework.

- Refine capabilities for dynamic analyses that capture the recursive nature of key economic processes in regional economies involving nonindustrial private forests.

- Assess the contribution of nonindustrial private timber resources to community and regional economic growth and development.

- Examine the role of nonindustrial private lands in determining the input supply areas for wood based industries in particular localities and regions. Update the nonindustrial private component of regional forest inventories.

- Examine the role of nonindustrial private forest lands in strategies designed to encourage the development of target industries in particular regions or localities.

- Define and assess public incentive programs for economic development, especially those which have special relevance for nonindustrial private forests (e.g., cost-share programs, technical assistance programs). Develop means of making such incentives more effective and more widely available. Develop estimates of program scale required for programs to be effective.

ISSUE: Multiple Goods and Services as a Focus for Management of Nonindustrial Private Forests

ISSUE SUMMARY

Forests are capable of simultaneously producing multiple outputs (e.g., recreation, water, timber, forage, wildlife) via numerous highly-complex biophysical processes. Any effort to influence the course of these processes requires a coherent information base delineating the many outputs which may be produced by the application of various management techniques (some of which focus on a single specific output).

From the perspective of the individual owner of a nonindustrial private forest, there is a continuing need for management information (organized within a multiple use framework) that depicts the variety of goods and services that may be produced; the management techniques required for their production; and the costs, prices and investment returns associated with various outputs.

The benefits of effective multiple use management focusing on nonindustrial private forests extend well beyond those experienced by owners of individual tracts. Wood supplies, clean air and water, viable wildlife habitats, and enhanced opportunities for recreational experiences are but some of the benefits of effective forest management which are enjoyed by all of society. Documenting these social benefits from private forestry, as well as the social costs of not encouraging their production, is a continuing research need.

Such information may provide individual owners with additional incentives for forest management by more clearly depicting their role in contributing to a more pleasing natural and social environment. Just as importantly, the collection, monitoring and dissemination of information on the social benefits and costs of private forest management may serve to foster stronger and more informed public commitment to nonindustrial private forestry.

An especially important component of multiple

use management of nonindustrial private forests is precise specification of values for timber, nontimber, and nonmarket outputs. Accurate assessments of benefits and costs associated with producing such outputs requires they be assigned a value. This can be in the form of dollar prices for goods and services exchanged in clearly defined markets; or as shadow prices for outputs that escape market mechanisms.

Information depicting the value of various forest based outputs can be important to constructing investment scenarios for private forest management. With respect to timber, for example, accurate and timely reporting of stumpage prices can be critical to estimating financial returns for timber investment opportunities.



Evaluation information regarding hunting, fishing and camping is similarly important to the investment decisions of a growing number of nonindustrial private forest owners seeking opportunities in such areas. Income from hunting leases, for example, can complement timber production activities by often providing owners with income between timber harvests--revenues that may significantly enhance rates of return from forest resource management activities in general. The pricing (including valuation) of such complementary goods and services may be critical to their investment decisions.

From a broader societal perspective, benefits associated with water and air quality, biological diversity, endangered species preservation, and aesthetically pleasing landscapes need the attention of valuation research since such benefits invariably elude private market mechanisms.

DIRECTIONS FOR FUTURE RESEARCH

- Identify and classify management techniques for the production of various combinations of goods and services from nonindustrial private forest lands, including tradeoffs among different kinds and levels of outputs.
- Identify management costs and financial returns, including economic tradeoffs, associated with the production of various combinations of outputs from nonindustrial private forests. Present such information in a format amenable to review by forest land owners who may not be familiar with concepts and practices involved in forest management.
- Develop methods for quantifying social benefits and costs resulting from the management of nonindustrial private forests for multiple outputs. Within such a framework, consider welfare gains from incentives to forest land owners, as well as the social costs resulting from failure to apply forest management techniques to nonindustrial private forests.
- Examine current forms and mechanisms through which information on social benefits and costs of alternative levels of forest management on nonindustrial private lands is made available to the general public. Develop strategies for enhancing the efficiency with which such information is disseminated.
- Characterize the structure of markets for market-priced nontimber outputs produced by nonindustrial private forests. Assemble data on revenues generated through leasing or other fee based provision of recreational services. Tailor the data for use in assessing projected returns from multiple use forestry investments.
- To the extent possible, develop a social accounting framework that incorporates the best quantitative estimates of social benefits derived from nonmarket outputs produced by nonindustrial private forests. A key element of such a framework will be the social costs incurred when levels of such outputs (e.g., soil stability, air and water quality) fall below certain critical thresholds. Contribution to cost minimization may then serve as one criterion for the evaluation of forestry investment alternatives. For more global nonmarket outputs (e.g., air quality), isolating the contribution of nonindustrial private forests from other landowner components of the forest land base in a given area or region will remain an important yet very difficult research need.
- Develop systems for documenting and reporting stumpage prices by species and geographical region. Identify organizations that collect such information and the source of funds for undertaking such activities. Assess the quality of the information collected.

ISSUE: Environmental Quality and the Management of Nonindustrial Private Forests

ISSUE SUMMARY

The decade of the 1980s fostered public concern over the quality of forest and related natural environments. Atmospheric deposition, species diversity, tropical deforestation, resource sustainability, groundwater pollution, insecticides and herbicides--all instilled a growing sense of concern over environmental conditions, the dimensions of which were increasingly recognized as global in nature. Not surprisingly, government was called on to formulate and implement coherent policies addressing these complex and multifaceted environmental problems.

Nonindustrial private forests, as a component of the overall forest resource base, may well be part of the cause as well as part of the answer to the multifaceted problems.

Nonindustrial private forests contribute to and are affected by many of the phenomena within the broad spectrum of environmental quality. Ironically, the relationships implied by such contributions and affects are often exceedingly complex, and in many cases less than well understood. For example, management of nonindustrial private forests has consequences for certain fundamental resources (i.e., soils, water, vegetation) which in turn have implications for, among other things, the habitat required by wildlife and the vegetation required to sustain aesthetic qualities needed for rewarding recreational experiences.

Similarly, the management of nonindustrial private forests may play a role (however small) in maintaining the appropriate balance between oxygen and carbon dioxide which is important to sustaining a healthy and problem free atmosphere (e.g., greenhouse effect). At the same time, however, nonindustrial private forests appear particularly susceptible to various sources and forms of atmospheric pollution (e.g., acid rain) linked to a variety of industrial, agricultural, and other human activities.

Biophysical relationships between management of nonindustrial private forests and environmental quality (e.g., linkage between industrially generated air pollutants and forest die-back) are

but one factor to be considered in developing effective environmental policies. Viewed more comprehensively, development of the latter also requires understanding the economic and social consequences of biophysical relationships (e.g., unemployment, price increases, incidence of pollutants on various populations), as well as the effectiveness of government programs (e.g., regulations, taxes and permits) capable of addressing environmental consequences deemed economically and socially unacceptable. To the extent such factors have implications for the use and management of nonindustrial private forests, they are deserving of a research focus.

DIRECTIONS FOR FUTURE RESEARCH

- Refine methods for identifying and measuring outputs from nonindustrial private forests in a manner amenable to assessing their impact on indices of environmental quality.
- Develop production functions specifying biophysical relationships between outputs from nonindustrial private forests and environmental quality and the impact of changes in environmental quality on the nature and viability of such forests. Consider such relationships at different levels of analysis, including the role and function of nonindustrial private forests in providing habitat for rare and endangered species; their impacts on regional water quality; and, to the extent possible, their role in mitigating adverse climatic changes.
- Refine methods for inventorying and monitoring nontimber resources on nonindustrial private forest lands as components of environmental quality (e.g., soil stability, water quality and quantity, wildlife habitat, wetlands integrity and air quality).
- Assemble and organize the above information and analyses in manners that will facilitate critical environmental policy decisions. An especially important decision focus is the level of public expenditures required to encourage production of desired environmental quality outputs from nonindustrial private forests.

ISSUE: Fragmentation and Ownership Changes Affecting Management of Nonindustrial Private Forests

ISSUE SUMMARY

Nonindustrial private forests are subjected to a variety of economic and social phenomena which foster changes in both their ownership per se, and in the amount of forest land owned by any one landowner. These changes are often especially noticeable at urban-rural interfaces, but can occur throughout the population of nonindustrial private forests.

Important potential consequences of ownership changes include fragmentation of larger contiguous landholdings into smaller parcels, consolidation of large holdings into even larger ownership units, and continually changing landowner objectives, void of any long term consistent strategic direction for the management of the forests involved.

The magnitude of these changes and their ultimate effects are largely unknown. For example, very limited is fundamental information about the extent of such changes within specific locales, regions and the nation as a whole. There is similarly limited understanding of the impact such changes have on the availability of timber and related forest-based outputs; the efficiency with which goods and services are produced by the forests involved; and the opportunities for public access to nonindustrial private forests.

Particularly obscure are the cross-boundary (urban-rural interfaces, forestry-agricultural interfaces) effects of ownership changes. These are of special importance with respect to the causes and spread of wildfire in areas where residential properties are intermingled with private (and public) forest lands.

DIRECTIONS FOR FUTURE RESEARCH

- Document the magnitude and character of changes in ownership of nonindustrial private forests (by state and region). Include the degree of fragmentation in ownership size and concurrent increase in numbers of individual holdings.
- Identify and characterize changes in the use and management of nonindustrial private forests in relation to changes in ownership. Consider the extent and impacts of penetration of residential and urban type uses into rural forests, in terms of whether and to what extent land use changes occur and in terms of the individual and social benefits and costs attributable to such changes. Examine the potential impacts on timber production resulting from the conversion of marginal agricultural lands to forest uses (although such may not necessarily involve change in ownership).
- Assess the character and extent of cross-boundary ownership changes and the concurrent intermingling of forest and nonforest land uses. Consider the effects of such processes on forest wildlife; assess the potential dangers of wildfire associated with accelerated residential development in forested areas. Develop a categorization scheme of potential problems that would be of use to planners and policy makers.
- Identify and assess implications of changes in the ownership structure of nonindustrial private forests for regional long term supplies of timber, nontimber marketable services, and nonmarket land uses and outputs.
- Develop and refine economic analyses which relate tract size and ownership patterns of nonindustrial private forest lands to the feasibility of producing different levels and mixes of forest outputs. Formulate such analyses so that results can be incorporated in broader regional assessments.
- Examine the potential for affecting changes in ownership patterns and fragmentation trends in different localities or regions via public policy mechanisms such as tax incentives, land use legislation and public-private land exchanges. Consider such options with respect to the basic forces underlying land use change, persons or organizations controlling such forces, ability of policy options to modify ownership patterns, and cost of implementing various policy mechanisms.

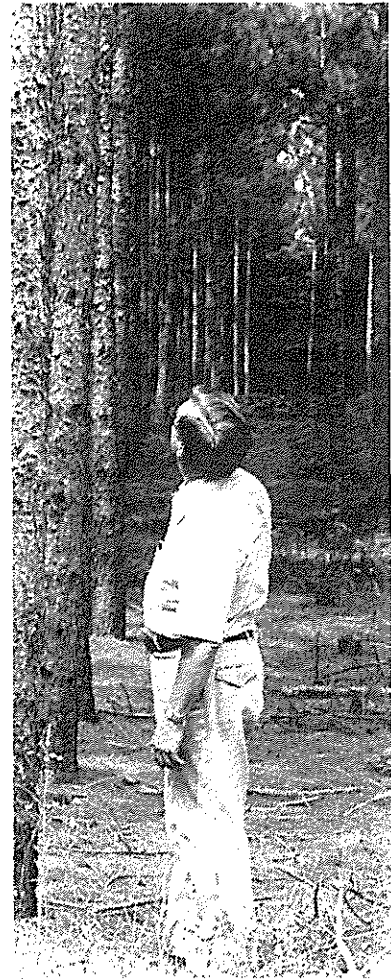
ISSUE: Professional Forestry Assistance and the Management of Nonindustrial Private Forests

ISSUE SUMMARY

The long-term physical and economic productivity of nonindustrial private forests is extremely sensitive to harvesting and related forest management decisions. Such decisions can be significantly influenced by the application of technical forestry principles. For example, systematic research-based field studies of nonindustrial private forests receiving professional assistance and those not using assistance in the same market areas have consistently found that forests using professional assistance suffer less logging damage, have more valuable species composition in residual stands, experience greater opportunity for economic returns from future stands, and have higher immediate stumpage returns to landowners.

Unfortunately, less than one-half of the nation's owners of nonindustrial private forests receive professional assistance. The consequences of this lack of attention are many, including landowner and society forfeiture of economic opportunities; a decline in the physical productivity of forests due to inappropriate forest practices (including poorly designed harvesting); a decline in the quality of forest and related natural environments (e.g., water quality, wildlife); and general landowner and society confusion over how to capture clearly identified economic opportunities represented by unmanaged nonindustrial private forests.

There is sound reason to believe that more widespread application of technical forestry principles by owners of nonindustrial private forests would result in significant additional benefits to both landowners and society. Unfortunately, little is known about the reasons landowners fail to use professional forestry assistance; about the share of total nonindustrial private forest acres attributable to such landowners; or about the appropriate public and private strategies that might encourage the use of professional forestry assistance.



DIRECTIONS FOR FUTURE RESEARCH

- Estimate more precisely the private and social costs of landowner reluctance to seek out and use professional forestry assistance at the time of harvest, including the number of acres and the magnitude of benefits likely to be foregone.
- Define more clearly the decision making context within which owners of nonindustrial

private forests decide whether or not to seek and use technical forestry assistance. For example, what decision rules are employed (e.g., efficiency, physical productivity)? How important are various forestry considerations (technical forestry assistance versus financial assistance)? And how important is the timeliness of various factors (i.e., availability of influential community leader)?

- Document the degree to which owners of nonindustrial private forest lands are satisfied with the nature and condition of their forests, as well as the factors accorded importance in their arriving at such judgments (e.g., technical forestry assistance).
- Identify sources and kinds of professional forestry assistance received by landowners. Determine the role of various actors in providing professional forestry assistance (e.g., loggers, interest groups, various public foresters).
- Assess the confidence of forest land landowners in the utility and reliability of alternative sources of information for forest management, with particular emphasis on factors deemed important in deciding whether to solicit professional advice. Delineate owner characteristics in terms of landowner awareness of potential benefits of assistance; level of confidence in alternative information sources; degree of concern regarding the imposition of constraints by professional sources; and actual and perceived institutional barriers to seeking assistance from public forestry professionals.
- Identify the comparative benefits and costs of timber harvesting on nonindustrial private forest lands with and without the use of advice of professional foresters.
- Ascertain institutional barriers to public foresters providing professional forestry assistance (e.g., staffing levels, financial support).
- Identify, rate, and assess the relative effectiveness of alternative strategies and tactics for ensuring the use of professional forestry assistance (reaching potentially receptive landowners):
 - Alternatives available: different combinations of actors, of programs, of messages, of terminology, of programs, of institutions (e.g., cooperatives, private associations).
 - Effectiveness of alternatives: political acceptability, administrative feasibility, economic efficiency.
- Determine means of implementing strategies and tactics found effective in encouraging the use of professional forestry assistance.
- Examine the relationship between owners' awareness and/or use of tax incentives for forest management and their use of professional foresters' advice.
- Assess the appropriate types and channels for delivering forestry assistance to various types of communities (e.g., community with high income, rapid population turnover and urban-type values versus community with low income, dispersed population and little population turnover).

ISSUE: Extensive Forestry Applied to Management of Nonindustrial Private Forests

ISSUE SUMMARY

Many owners of nonindustrial private forests do not have or are unwilling to commit the financial resources required to produce timber via the application of intensive timber management practices (e.g., site preparation, stand establishment, intermediate thinnings). At the same time, owners may not be averse to harvesting timber, particularly if a cash flow can be generated and if they are confident that timber harvesting will be beneficial to the continued viability of their forests. Needed is consideration of lower cost alternatives to more traditional intensive methods of timber management -- alternatives that enable more owners of nonindustrial private forests to consider timber production as a viable investment.

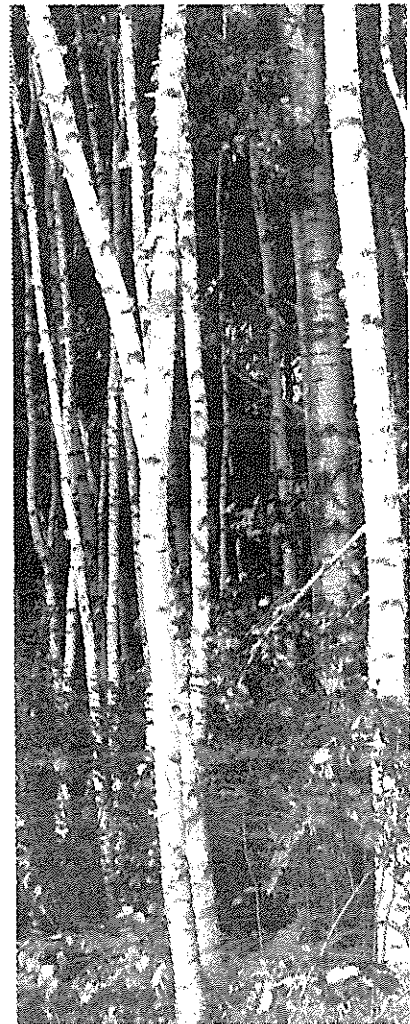
In addition to such low-cost alternatives resulting in the production of wood fiber, they may provide improved wildlife habitat and complement other nonmarket objectives sought by forest owners. In such a context, research leading to the identification and description of extensive low cost natural stand management techniques could be an important step toward more active--yet low intensity--management of greater acreage of nonindustrial private forests.

DIRECTIONS FOR FUTURE RESEARCH

- Conduct applied silvicultural research on methods for extensive timber management. Describe results in terms of timber production and the production of related forest outputs (e.g., wildlife habitat, aesthetic amenities, recreation). Focus on production function information needed for financial and economic analyses.
- Perform economic analyses on comparative costs and returns of extensive versus intensive timber management techniques. Identify low cost management alternatives and

estimate values of nontimber resource benefits that may be obtained using extensive methods for timber management.

- Conduct growth and yield studies for various forest types and tailor results to provide forest land owners with accurate information on the developmental patterns of mixed stands.



ISSUE: Forest Inventory Information Affecting Management of Nonindustrial Private Forests

ISSUE SUMMARY

Of major concern to public and private managers and planners is acquiring accurate and timely information that depicts current and projected inventories of forest biomass and various forest resources (e.g., timber, wildlife habitat). Such information is important to program planning and investment decisions concerning nonindustrial private forests.

Inventory and analysis units at federal and state levels periodically collect and report some of this information. Further refinements are needed, however, particularly in the area of nontimber resource delineation and measurement. For example, in addition to the ongoing incorporation of growth and removals as part of updating timber inventories, more accurate information is required on the use of timber by primary wood processors (i.e., pulp mills, sawmills, consumers of fuelwood) and on the relationship of such use patterns to timber removals.

On a broader scale, changes in land use and ownership are key data concerns that reflect factors underlying production patterns characteristic of local and regional forestry sectors. Accurately representing their status within the structure of regional forest inventories via collection of the above kinds of information is an ongoing challenge.

Information organized within the framework of regional forest inventories is critical to developing models for projecting timber supplies on local and regional bases, of which nonindustrial private forests are a part. Further development of such models would greatly aid state and substate level forest planning efforts and would be useful to industrial firms concerned with mill siting and other strategic questions concerning resource use, capital investment and product marketing.

A related concern involves the modeling of linkages between use of timber by local mills and local timber demand (and forecasting that

demand). Models of regional timber supply and demand should complement national models for the timber resource and should contribute to a more accurate representation of forest-based sectors within broader models for regional economic development.

DIRECTIONS FOR FUTURE RESEARCH

- Enhance the accuracy, timeliness and distribution of forest survey information dealing with nonindustrial private forests, especially information concerning timber and biomass resources.
- Continue to refine means of estimating, quantifying and reporting nontimber forest resource inventories and outputs from nonindustrial private forests.
- Develop and refine annual or periodic surveys of wood use by primary forest products firms and commercial and residential fuelwood users. Specify statistical relationships between wood users and timber drain in local and regional areas, with a special focus on nonindustrial private forests.
- Identify current patterns of nonindustrial private forest land ownership and owner management objectives. Integrate these within a dynamic framework capable of modeling present and projected relationships among forest, agricultural, rural, residential, and other land uses.
- Develop and refine models to project timber supplies on local and regional bases (with a special focus on nonindustrial private forests), insuring the satisfactory interfacing of such models with data elements of regional forest inventory systems.

Priorities, Investment Levels and Organizational Requirements

The research agenda presented here is sufficiently large and extensive in geographic scope and subject area to require the talents of various organizations. It is not the task of any one establishment. Within the forestry and natural resource community there exists a variety of organizations that can be called on to actively support and engage in research concerning nonindustrial private forestry.

Among such organizations are universities and associated agricultural experiment stations; research, policy analysis and state and private forestry units of the USDA-Forest Service; various private forestry and natural resource consulting firms; numerous foundations and centers of excellence having an interest in forestry; and forestry and natural resource extension organizations (to the extent such organizations have research responsibilities). The task is big. The organizational sweep should be equivalent to the charge.

The research agenda and the financial support necessary to accomplish its recommendations, should be guided by the wisdom of policy and program analysts, the insights of administrators and practitioners actively engaged with public programs focused on nonindustrial private forests, and the experiences of nonindustrial private land owners and the persons on whom they rely for forestry advice. From a national perspective, recommended research priorities of such groups will invariably be as diverse as they are plentiful. In general, however, high priority research should reflect the importance of the issues as defined by the collective experiences of all or significant parts of such groups. Given such a context, special efforts should be made to direct research to the issue areas previously identified.

Specific studies or research projects to be undertaken within the above categories are not identified here. They should be the products of intense consultation between researchers, program analysts and administrators of research and nonindustrial private forestry programs. Such consultation can be guided by examples of strategic research directions

identified here and elsewhere. In general, however, the specific research projects and studies to be undertaken should be selected with the following in mind:

- Is the problem to be addressed important? Will the information provided by the research make a difference? Will the research results affect a large number of units (many people, acres or much production) or, if the units are few, will they be affected in a profound way?
- Is the research to be undertaken likely to succeed? Can the research be carried out to a successful conclusion in a specified period of time? Is the probability of failure significant (model cannot be built, data not obtainable, theory unavailable)?
- Are competent and interested personnel available to undertake the research? Does the research organization have sufficient capacity to sustain a commitment to the research? Can the research results be easily communicated to potential users?

Financial investments in research focused on the priority categories identified should be commensurate with the value of the information made available to landowners and to program managers, and should bear some relation to the social value of the products and services that nonindustrial private forests are capable of producing. The latter is placed in context by the over 70 million acres of nonindustrial private forests worthy of management practices yielding at least a 4 percent real rate of return (the average long run real rate of return on investment in the private sector).

An investment of over \$7.2 billion would be needed to capture such opportunities. It is an amount reflective, at a minimum, of the value of goods and services produced by the nation's nonindustrial private forests.³ In such a context, the commensurate, additional research and evaluation effort undertaken would be about 0.01 percent of the total investment, about \$700,000 annually, and should be focused on the above issue areas over the next 10 years.

Research involving nonindustrial private forestry can take many forms. As presented in this discussion, some issues imply actions that can entail research focused on alternative courses of action while other issues imply research concerning the collection and processing of information. Most certainly, some of the suggested research will require long-term sustained efforts. For example, coming to grips with some means of more effectively valuing environmental consequences of management actions undertaken by nonindustrial private forest owners, and subsequently incorporating such values into the calculus of public and private forestry decisions, will entail considerable long term effort.

Some research may, however, be very applied and entail little in the way of new approaches or methods. The continuing and critical need to evaluate and monitor ongoing public programs focused on nonindustrial private forestry is an example.

Also to be recognized in research priority setting is the highly regional orientation of many issues and the need to address them in that context. For example, urban expansion into the nonindustrial private forest base and the resulting ownership fragmentation is certainly acute in the Northeast. It deserves special attention in the context of that region.

Conclusion

Nonindustrial private forests are an important part of the nation's forest land base. Via their ability to produce a variety of important goods and services, they are significant contributors to the economic and social well-being of the nation.

Nonindustrial private forests have the potential to be even greater contributors to desired conditions, and they can do so in economically and socially acceptable fashions. Unfortunately, such potentials cannot be realized without significant attention by the forestry and natural resources research community, especially the economic and policy sciences portion of that community. A clearly defined research agenda, such as that suggested here, focusing on important problems and issues, can provide significant guidance to resolving many of the

deterrents that inhibit greater contributions by nonindustrial private forests.

The talent to undertake such research and the institutional structure for supporting it are generally available. Needed is a financial commitment--modest in comparison to contributions of nonindustrial private forests--that will enable the research community to get on with that tasks.

³ An Analysis of the Timber Situation In the United States 1989-20240. Part II: The Future Resource Situation. A Technical Document Supporting the 1989 RPA Assessment. Forest Service. U.S. Department of Agriculture. Washington, DC. 1989.



