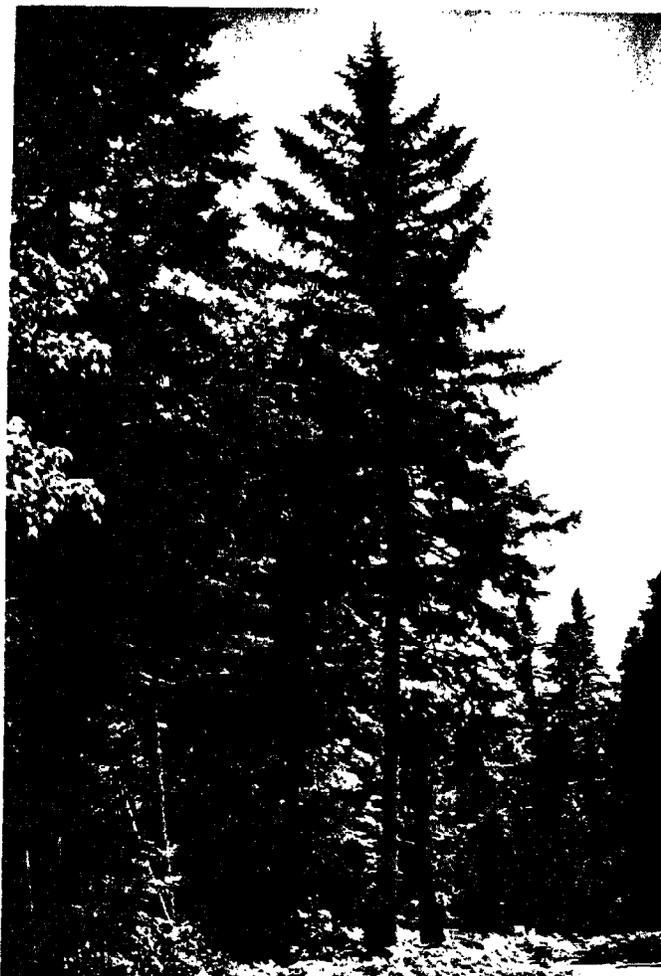


**Proceedings of the
SYMPOSIUM ON
INTENSIVE CULTURE OF
NORTHERN FOREST TYPES**



**USDA FOREST SERVICE GENERAL TECHNICAL REPORT NE-29
1977**

**FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
NORTHEASTERN FOREST EXPERIMENT STATION
6816 MARKET STREET, UPPER DARBY, PA. 19082**

FOREWORD

THE NORTHERN FOREST TYPES constitute a vast natural resource for the United States and Canada. For instance, in the eastern United States there are more than 10 million acres of commercial forest land supporting spruce and fir types alone. The magnitude and variety of this resource is such that treating it in any detail at a 3-day meeting was impossible. Rather, the idea that germinated and developed into this symposium was to present a broad picture of the extent of our knowledge of intensive cultural techniques, the status and trends of our research in the northern forest types, and some actual experiences in managing this resource; and to explore those factors that affect our use of the intensive cultural techniques we have at hand.

There is no doubt that we face a new era in the management of northern forests. The production of wood products is no longer the primary objective of many owners, and increased pressure for the social values of our forests is being felt by all landowners. We must recognize these other forest values, which in turn dictates intensification of all aspects of forest management if we are to meet the future demands of a wood-hungry society.

The enthusiastic efforts of the symposium sponsors—the School of Forest Resources, University of Maine; the Maine Bureau of Forestry; the Maine Forest Products Council; and the U.S.D.A. Forest Service—and the individuals behind those efforts, should be commended. Special thanks are due to Great Northern Nekoosa, Inc., and Brooks B. Mills for their help in providing interesting field trips, and to the Casco Bank and Trust Co. for sponsoring the symposium brochure. Also, without the enthusiastic participation of the experts invited to present papers, and the moderators of each session, the Symposium could not have taken place.

—**BARTON M. BLUM**
Symposium Chairman

PUBLISHER'S NOTE

This report is published by the Northeastern Forest Experiment Station as a public service. The papers it contains are published as received from the authors. Any questions or comments about these papers should be directed to the authors.

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SYMPOSIUM ON
INTENSIVE CULTURE OF
NORTHERN FOREST TYPES**

*held 20-22 July 1976 at Nutting Hall, University of Maine, at
Orono.*

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- School of Forest Resources, University of Maine
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PLANNING FOR & IMPLEMENTING INTENSIVE CULTURAL
LONG & SHORT RANGE PLANNING

by Lester W. Hazelton, Director-Timberlands, Planning & Development,
Great Northern Paper, Millinocket, Maine.

Abstract

Great Northern Paper, a major industrial forest owner in Maine (2,000,000 acres), began a program for more intensive silviculture in 1972. The first step has been a major woodlands reorganization into five geographical districts with forest management and procurement responsibilities delegated to these districts. This has been accompanied by a re-inventory of timberlands and development of a new computer-processed resource and information system (WIPS). Current and future major emphasis will be placed on improved administrative procedures for the very close coordination of wood procurement, logging and forest management functions to insure the realization of the maximum growth and quality potential of Great Northern's timberlands.

Introduction-background

Great Northern Paper, a division of Great Northern Nekoosa Corporation, is a major forest products manufacturer and forest owner in Maine with approximately 2,200,000 acres of total ownership. Initial purchases were for approximately 350,000 acres in 1900 with subsequent purchases taking place through to the early 1950's. Since that time, land sales, exchanges, and State park establishments have reduced total ownership, but Great Northern still retains nearly 2,000,000 acres of forestland. Our principal use and demand on this forest has been for the spruce (Picea (L.)) and fir (Abies (L.)) timber found in its softwood types.

The initial working or forest management plan for Great Northern's timberlands was developed by the U. S. Forest Service's forerunner, the old U. S. Bureau of Forestry, in 1904. It is interesting to note that the Bureau of Forestry's (Mr. M. C. Hodge, Jr.¹) initial recommendation for operating these timberlands (365,000 acres) included minimum diameter limits on spruce of 12", on fir of 8", a projected cutting cycle of 53 years, and a cut regulation of 6,338 acres annually, with annual harvest volumes of 13,437,000 fbm. Although Great Northern has revised its forest management plans periodically over the past 70 years the initial thinking and silvicultural concepts which went into this original plan are still alive, still valid, and still form the basis for the recommendations made today by our present staff

of foresters.

Great Northern's most recent plan revisions and developments for more intensive silviculture began in 1972 with a basic reorganization of the woodlands department into five geographical districts. This change was made concurrent with a major re-inventory of our total timberlands and the decision to develop an improved resource information system.

Our present and future emphasis for improved forest management will be on the actual administration of the forest and improved harvest operations to insure that Great Northern achieves the full potential in growth and economic returns from its timberlands. Thus the following brief case study of a planning effort by one large corporate owner will consider - I The Organization, - II The Information System and - III The Administration for that Forest Resource.

I ORGANIZATION

In 1972 Great Northern's demand for total softwood reached nearly 1,000,000 cords annually. This total demand on the forest resource had been carefully assessed during the 1960's and the supply was considered adequate to support it. However, in projecting for long range future supply on a state/national basis, including recent regional expansions in wood consumption, Great Northern made a considered decision to improve its own posture in relationship to the total forest resource. The first step was a basic reorganization of its Woodlands Department and in the functioning of its procurement-forest management responsibilities. A considered objective was to delegate and incorporate forest management responsibility more closely to the forest, to the stump itself, and to the people directly in charge of forest harvest and management operations.

Great Northern's total wood draw area includes nearly 40% of the State's total forest area, (6,000,000 acres) and a million acres or so of forest land in New Brunswick and Quebec. This area, influenced considerably by Great Northern's own land ownership pattern, was divided into five principal procurement-management districts. These districts range in size from 1,000,000 acres to 2,000,000 acres with GNP forest ownership in the districts ranging from a minimum of 100,000 ± acres in our Penobscot District to over 1,000,000 acres in our West Branch District.

The districts themselves for forest management purposes will be further divided into management units, consisting of several townships, with each township divided into individual planning units. The planning unit itself is a refinement of the old

standard forest compartment and is designed to be the basis for all information and forest planning.

The major personnel and responsibility changes in our new district system have been the increase in forestry staff within each district and the direct delegation of nearly all forest management activity and responsibility to the district superintendent.

Previous to 1972, Great Northern had a loosely structured Purchased Wood and Operated Wood procurement districting with total forest land management responsibility centered at the Woodlands Department headquarters (Division of Forest Engineering).

For a large industrial forest owner and consumer of the forest, who is as concerned with the economics of the harvest as with forest growth, this close integration of responsibility for the success of the total system is critical. We have been pleased with many features since inaugurating this new districting (more innovative thinking by field forestry personnel) but we still have much to do to fulfill original organization objectives.

II RESOURCES INFORMATION SYSTEM

As Great Northern considered its position in regard to silvicultural decisions, softwood supply and also expansion into other products, it became apparent that an improved resource information system was a necessity. Great Northern's last complete inventory of its forest lands had been performed in 1953. Since that time inventories had been kept current through systematic measurements of growth plots and, of course, harvest deletions. The existing inventory records for softwoods were considered accurate, and in fact have been so confirmed by the recent re-inventory conducted by the James W. Sewall Company (completed in 1976). However the hardwood volumes and other miscellaneous species had not been as well addressed. These considerations, plus the need to develop a total computer-processed forest data base on which to develop supply-demand projections, silvicultural and land-use programs, prompted a management decision for a complete and new inventory of the forest. This re-inventory was finished last month.

The new forest inventory will become part of, will be controlled by, will be manipulated, and drawn upon by a newly installed forest resource information system (GNP-WIPS - Woodlands Information & Planning System²). This system, of course, is computer processed. The principal design work and installation of this new system has been the prime responsibility of Mr. L. O. House, a recent staff addition to Great Northern's Woodlands

Department.

Briefly summarized, the WIPS system will furnish us with the following:

1. Effective and rapidly developed long and short range harvest options for basic planning units, management blocks, districts and for the total woodlands' operation.
2. Effective and rapid update of information for the total forest resource and the total land area (Land Use Planning).
3. Rapid evaluation of varied silvicultural systems, their effect on the total forest and on district forestry management.

The WIPS system as presently structured consists of the following subsystems:

- A data base - the informational heart of the system.
- A master file - for each basic planning unit (2,000 to 4,000 acres), an informational filing system on microfiche for district and staff day-to-day use.
- Pre-operation evaluation - stand and operational cruising for product volumes and silvicultural information.
- Inventory updating - growth and inventory plots randomly located.
- Growth and yield simulation - prediction of future stands.
- Capital investment evaluation
- Short range planning
- Long range planning

Although the development of this total information system is far from complete we have already begun to reap some of the benefits from it. Cruises this past spring for example have been rapidly computed (within 1 or 2 wks. after completion) with a wealth of necessary stand information available for district

foresters to make more accurate silvicultural and operational recommendations.

Because of the size and complexity of this natural forest we are dealing with in Northern Maine, it is almost mandatory that we develop all available and pertinent information prior to making silvicultural or operating decisions. We believe this system under development will provide that information.

III ADMINISTRATION OF OPERATIONS

A viable forest management organization to structure the forest, the operations and its people is one important phase; vital and pertinent forest stand information is certainly another; but the actual operation itself - the planning, harvest, transport, and conversion of products, road construction, fire protection and forest practices - is the pay-off and the culmination of the process.

There are many planning and operating areas which we consider important and critical to intensive silvicultural development.

Some of those most important to Great Northern are:

- (1) - Research
- (2) - Road construction
- (3) - Logging systems
- (4) - Silvicultural criteria

(1) Research: The principal and first new position created in order to accelerate our development of intensive silviculture was that of Research Forester. The objectives of this position are in the field of applied research, to test and implement improved silvicultural techniques in our softwood types. Our emphasis to date has been in the area of regeneration. We have a pilot greenhouse and planting program underway.

(2) Road construction: The very wording "intensive culture" implies travel access to, and on the land in order to apply silvicultural practices. In 1904 the U. S. Bureau of Forestry recommended a 53 year cutting cycle for Great Northern; by 1955 P. K. Patterson, then Superintendent of the Division of Forest Engineering for Great Northern Paper, recommended a 30 year cutting cycle for the ensuing 10 year period. In 1976 we are realistically planning on 20-30 year cutting cycles where possible and feasible under the selection system. By 1986, certainly with the virtual completion of road systems onto GNP townships, we should

be able to consider 15 and 20 year cutting cycles in nearly all areas where we are applying a selection system or uneven-aged management.

Intensive silviculture on large forest ownerships depends on a well designed and economical transport system.

(3) Logging systems: So closely is logging and harvest technology wedded economically, and dependent on the tree and the land that we may assume they act and interact as one total and integrated system. To consider silviculture apart from the techniques, the machines and the men who work the forest, who actually conduct the harvest, is to deny this integration and to forfeit its benefits.

The forest which Great Northern harvested in 1945-1955 was in large measure influenced and created by the men and logging technology of the early 1900's. The forest stands which we are harvesting today were created for us by the men and machines of the 1940's and 1950's; and we also are creating anew, the forest for the loggers and forest managers of the 1990's and 2000's.

Great Northern, in its own logging development, (T. A. Wildman, Logging Engineer) is actively engaged in seeking out and testing those machines and systems which have the flexibility and capability of many and varied silvicultural applications - clear-cutting, thinning, timber-stand improvement, site preparation and planting. The wheeled skidder itself of course is a remarkable forest machine which has been specifically developed over the past 15 years by foresters, loggers and logging engineers - the economic benefits for forest industry have been substantial.

(4) Silvicultural criteria for Intensive Management: The criteria for tree harvest on an extensive basis in our spruce-fir types has been varied over the 75 year period. We have noted the original forestry cutting recommendation by the Bureau of Forestry as 12" on spruce and 6" on fir. This criteria was not followed - in the heavy budworm salvage years and afterward into the 1930's, stocking on GNP lands was so reduced that operations were conducted in stands containing only 4-5 cords per acre of spruce and fir. In 1955, however, GNP set overall diameter limits of 8" on spruce and 6" on fir for its cutting policy. In 1963, long range cutting programs (5 year) were outlined using a 10" minimum diameter class (DBH) on spruce and 6" on fir to backup ongoing marked selection cuts in spruce-fir stands. These criteria since 1955 have been generally followed in stands where application was feasible.

Great Northern, in its current program to intensify forest management on its forest lands, will establish cutting standards

and criteria on a stand basis, with the overall responsibility for setting standards and controlling silvicultural practices delegated to district forestry staffs.

Specific criteria

(a) Stocking: We have accepted the basic guidelines and goals for spruce-fir stands as developed by the Maine Chapter of the S.A.F. in their recent publication "Forest Practices, Goals and Standards", issued in December 1973.

(b) Cutting cycles: On those areas and stands where a selection system (uneven-aged management) is deemed feasible we are recommending a 20 year cutting cycle. Our previous projected cutting cycles for 1955-1975 had been based on 30 years. In this instance, of course, stand condition and road systems have been a principal determinant.

(c) Spruce budworm salvage: In our efforts to respond to the damages and losses due to the spruce budworm we have also had to set some basic criteria. In selection cuts we will harvest fir to a 6" minimum diameter. In stands to be clear-cut for salvage/pre-salvage operations, a minimum volume/basal area of fir of 30% has been chosen as an initial guide.

All spruce-fir stands, of course, are assessed and rated on a priority basis for current and prospective budworm damage. Operating plans are based on this assessment.

The above silvicultural criteria are an indication and example of our overall approach to a more intensive management system. We find ourselves in the midst of this planning process and a great deal remains to be done.

Conclusion: Great Northern is developing and intensifying its forest management by a careful step-by-step approach, based on assignment of forestry responsibility directly to the forest practitioner, by building a good resource information system, and developing administrative procedures which more closely integrate the total forest activity cycle of regeneration, growth, and harvest.

In closing I should like to respond briefly and directly to Mr. Hodge (in absentia) from the U. S. Bureau of Forestry. His final recommendation and dictum to Great Northern Paper in his report of 1904 was as follows:

FORESTER

"It is recommended that the Company employ a forester perma-

nently, whose duties shall be: To decide what areas should be cut; to supervise the marking of trees; to inspect and criticize logging contracts; to supervise the protection of the tract - - -"

To Mr. Hodge: Great Northern Paper has hired a forester - several of them, in fact, whose duties are substantially as you have recommended. We hope to achieve, in time, a forest management program as well conceived as the original working plan which you developed for us in 1904.

¹M. C. Hodge Jr., "Working Plan for Penobscot Timberlands-GNP Co.", 1904.

²Kwen M. Du and L. O. House, "Woodlands Information and Planning System," Systems Analysis and Forest Resource Management, ed. J. Meadows, et al, (Bethesda, Maryland: Society of American Foresters, 1976), pp 427-32.