A REPORT

by the

Interim Commission to Study Methods to Assure Greater Productivity from the Forest Lands of Maine

December, 1946

LETTER OF TRANSMITTAL

To Members of the 93rd Legislature:

We are submitting herewith the report of the Interim Commission to study methods to assure greater productivity of the forest lands of the state. This Commission was authorized by the last legislature and appointed by Governor Hildreth and approved by the Council on August 9, 1945.

The Commission has held monthly meetings during the past year beginning in October 1945 to study the problems in connection with the forest lands of Maine as well as the utilization of their products.

In the course of our investigations and monthly meetings much data and information were obtained from well known authoritative sources such as the Forest Products Laboratory, Madison, Wisconsin, various State Forestry Departments, Associations, Colleges and other agencies. The Committee also invited experts and technical men to appear and give their views regarding the various problems involved. David Stevens, Tax Assessor for Maine; R. E. Rendall, Forest Commissioner; R. M. Evans, Regional Forester, U. S. Forest Service; H. E. Brinckerhoff, Secretary, American Pulpwood Association; John Lambert, Massachusetts Conservation Department; Paul Malone, Tax Expert, U. S. Forest Service; Frank Ineson, Northeastern Forest Experiment Station; appeared before the committee to advise and assist in basic information in connection with this report.

Special arrangements were made to have an aerial forest survey made of Hancock County by the U. S. Forest Service in cooperation with the State Tax Commission. Part of the funds were supplied by the State and the balance of

the amount necessary to complete this aerial survey was subscribed by interested land owners. The committee has broadly interpreted its duties in connection with the study of the forest lands of the state and has included the present major problems that are involved in the greater productivity of the forest lands, together with certain recommendations to improve the forests of the state and the economic conditions in connection with the utilization of forest products.

James W. Sewall made outstanding contributions to the work of the Commission and to the report and served as a Commission member until his death. Lester Crane was appointed to replace him and assist in completing the report.

Respectfully submitted,

R. E. CLEAVES, JR., *Chairman*
GEORGE D. BEARCE
HARVEY A. CLARK
LESTER CRANE
DWIGHT B. DEMERITT
JAMES A. GILLIES
CURTIS M. HUTCHINS
ALBERT D. NUTTING, *Secretary*
ARTHUR N. STOWELL

FOREWORD

The Interim Commission to study the forest lands of the state surveyed the field during the early meetings and decided that the problems were so complex and varied that our report should be divided into the following seven subjects:

1. Forest Survey of Timber Resources
2. Organization of the State Forestry Department
3. Forest Conservation Regulations and Cutting Rules
4. Utilization of Wood Products
5. Taxation Problems
6. Forest Protection
7. Development of Woods Roads

Various sub-committees of the general Commission were appointed to study and later report on the above which were revised and approved tentatively by the entire Commission.

In order to check our deliberations with the forest industries, including pulp and paper, wood turneries, and long lumber, public meetings were held in Bangor, Portland, and Rumford. Reactions at these meetings were used as a basis for this report.

Members of the Commission realize that there are other subjects deserving attention but considered those listed above of the most importance at this time.

The Commission believes that a timber inventory of the State is of extreme importance. With this in mind, State funds of $7000 were secured through the Governor and Council and $1500 from interested land owners to make an aerial map of Hancock County as a basis of determining the advisability of such a survey for the whole state. The aerial maps were necessary to obtain assistance of the U. S. Forest Service in starting a timber survey and forest tax study for Maine.

The Commission believes strongly that the carrying out of these recommendations will greatly enhance the development of the State physically and industrially.

Forest Survey for the State of Maine

There has been considerable agitation, both State and Federal, and in some cases local, to regulate the amount of timber which can be removed from forest lands and the method by which the timber shall be cut. No regulatory measures of this nature can be made on a sound basis nor can intelligent planning of a state-wide economic nature be started until the inventory and growth rate are known as indicated above.

Forest taxation should be based upon adequate data being available as to the productive capacity of forest land. Such data should be known under our present tax program and in any future program. Data should also include the present standing timber quantities.

Inasmuch as forest lands of Maine furnish raw materials for hundreds of industrial plants manufacturing numerous types of forest products and inasmuch as the forest products industry in the State of Maine produces one of the largest incomes to the people, an inventory of the raw materials available for production and commercial development is needed. The raw materials are grown on an area of land occupying approximately 16 million acres or over ¾ of the land area of the State. They are widely scattered from North to South and East to West within the State, and the size of the ownership of the land is exceedingly variable. Certain large corporations hold relatively large acreages, but in addition, especially within the organized townships there are many small areas with hundreds of individual owners whose acreage adds to sizeable amounts. The larger companies have their own information concerning their lands but small owners do not have such information. Most owners of small tracts usually have no idea of the quantity of timber growing on their land, the species of timber growing thereon, nor the rate of growth of any of the species.

The productivity of these forest lands is intimately tied in with the continuity of the industries which use wood as a raw material. The communities in which these industries are located are dependent in many cases almost entirely upon the fabrication of wood into a commercial product.

No one can predict or determine with reasonable accuracy the quantity of timber that can be removed annually from Maine's forest lands and still maintain their continuity with data now available. This will be true until an accurate inventory and growth rate are made by species. From this must be deducted the annual damage and loss from fires, insects, and diseases.

On May 22, 1928, an act of the United States Congress provided that the United States Secretary of Agriculture is authorized to make a forest survey of the United States. This survey has been under way since that time. The western part of the United States, a portion of the central part and a portion of the southeastern part have been completed. It is understood that this survey is planned to extend into the northeastern region within a reasonable length of time. Owing to the importance of the industry in Maine it would be desirable if this survey could be made at once.

Following is a copy of a letter from the Director of the Northeastern Forest Experiment Station, United States Forest Service, Department of Agriculture, which indicates the Federal aspects and approximate cost involved in making a forest survey in Maine:

"In 1944, Congress, as you know, increased the authorization for new surveys of 3½ million dollars in order that all heretofore unsurveyed regions like the Northeast might be covered. It also authorized out of this amount a maximum of $750,000 annually for such surveys. Last year the full $750,000 was actually appropriated and out of this sum we were allotted $230,000. If $750,000 is appropriated annually until the 3½ million is exhausted we would expect to receive about $230,000 annually for 4 years and then a smaller amount the fifth year for completion of compilations and reports. The point I am making is that our plans for the original survey of the Northeast visualize four years of field work (starting last July) in which to cover all twelve states in our territory. After the original survey there is, of course, the job of keeping the forest statistics up to date, but that is a job in the future.

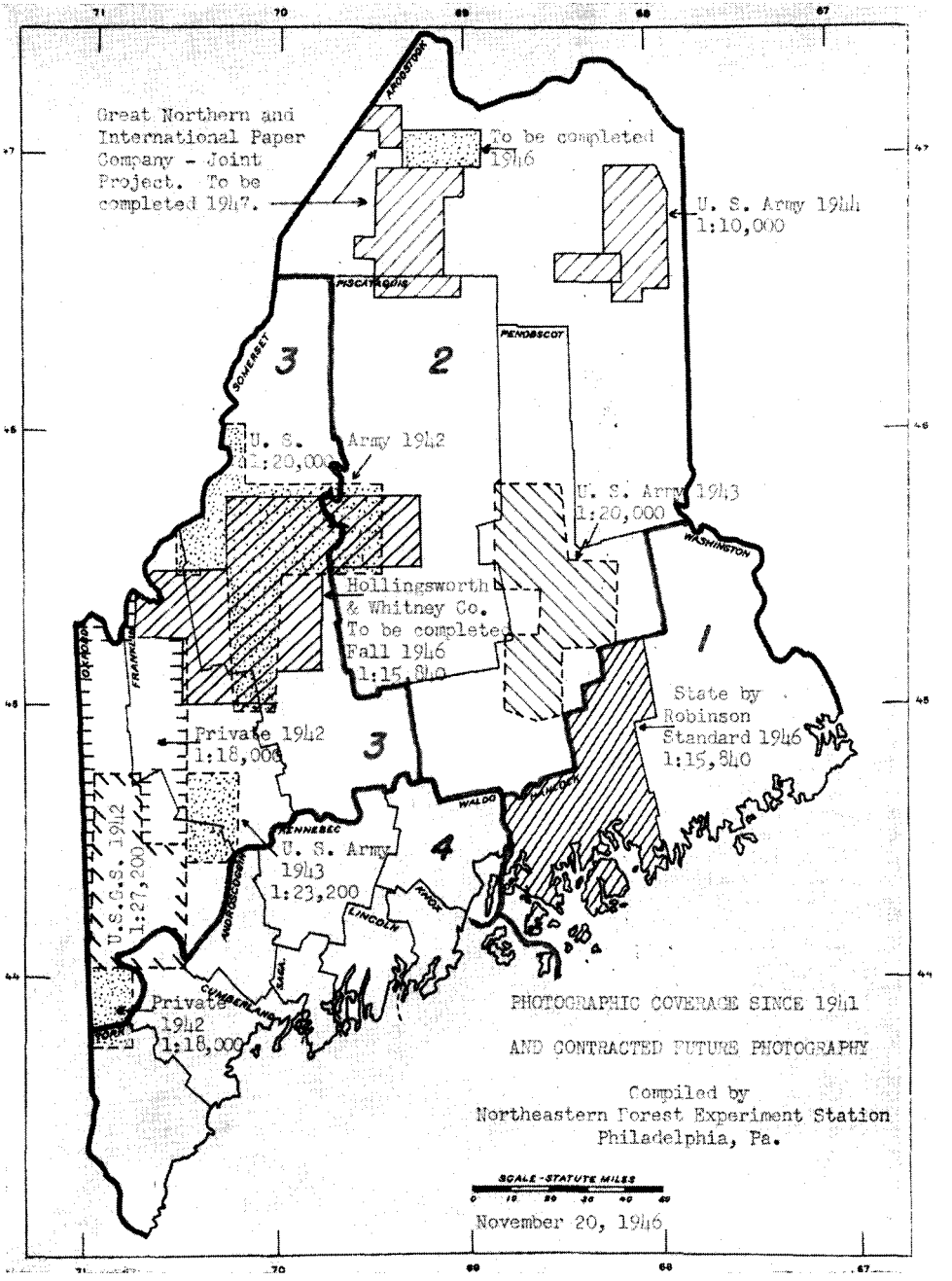
"In order to program our work to take maximum advantage of acceptable aerial photos from which to make our forest resource interpretations, we are very anxious that photographs be available in each state in time for our field work. We do not contemplate doing, or having done, the aerial photography ourselves. Our survey money

is only enough to interpret the pictures, perform the necessary ground checks, carry on forest drain studies, etc. Our plan is to arrange for the use of existing photos whereever they are acceptable to our purpose and such arrangements are feasible. Beyond these existing photos, we hope the state, land owners, or other agencies by themselves or cooperatively—will have the necessary new flying done and make the pictures available to us for forest survey purposes. I am sure this will be possible in many of our states and the availability of the photos will govern to considerable extent the priority of survey.

"As for Maine, the situation with respect to acceptable existing photos; to the need for new pictures; and, program of survey work is about as follows:

"1. For organization of field work and compilation of the data we divide each state up into survey units. Maine has been tentatively divided into four such units, as shown on the enclosed outline map. Field work in Hancock County using State-provided new pictures will be completed within the next few days, and upon completion of the photo interpretation we will proceed with the compilation of area and volume data for the County as a whole. It would be highly desirable for us to schedule the survey of Washington County for 1948 in order that the data collected might be reasonably consistent with that obtained for Hancock County this year. The old photos available for Washington County (taken prior to 1941) are none too well suited for our purpose. You can appreciate the much larger job which would be involved in bringing the data interpreted on the photos up to date, allowing for cutting and other drain factors and for growth. There are approximately 2,915 square miles in Washington County. We estimate that it would cost about $13,500 to provide photos on a scale of 1:15,840 similar to those provided for Hancock County. This would give two sets of contact prints and index sheets.

"2. Only 17 percent of Survey Unit No. 2 has suitable aerial photography now or comtemplated so far during 1947. The U. S. Army photographs may not be available for purchase by outside agencies. Perhaps, however arrangements can be made for purchase by outside agencies. We have no arrangements yet with the Hollingsworth and Whitney Company nor with the Great Northern and International Paper Companies for use of their projected photographs. It would be necessary for us to make relatively temporary use of these as long as we have access to them


Great Northern and International Paper Company - Joint Project. To be completed 1947.
To be completed 1946
U. S. Army 1941 1:10,000
U. S. Army 1942 1:20,000
U. S. Army 1943 1:20,000
Hollingsworth & Whitney Co. To be completed Fall 1946 1:15,840
State by Robinson Standard 1946 1:15,840
Private 1942 1:18,000
U. S. Army 1943 1:23,200
U.S.G.S. 1942 1:27,200
Private 1942 1:18,000
AROOSTOOK
PISCATAQUIS
PENOBSCOT
SOMERSET
WASHINGTON
FRANKLIN
OXFORD
KENNEBEC
WALDO
LINCOLN
ANDROSCOGGIN
CUMBERLAND
SAGA.
YORK
1
2
3
4
PHOTOGRAPHIC COVERAGE SINCE 1941
AND CONTRACTED FUTURE PHOTOGRAPHY
Compiled by
Northeastern Forest Experiment Station
Philadelphia, Pa.
SCALE - STATUTE MILES
0 10 20 30 40 50
November 20, 1946

at future periods for resurvey purposes. The 12,227 square miles for which suitable photos are not available in Survey Unit No. 2 would cost approximately $56,500.

"3. Nearly 70 percent of Survey No. 3. is covered by suitable aerial photographs. This would be a good unit for us to get into soon, assuming we can be assured that suitable photographs would be available for the uncovered portion of about 2,479 square miles. Such coverage would cost approximately $11,500. For the part already covered, arrangement may be possible to assure the availability of U. S. Army and U. S. G. S. coverage. Perhaps some arrangement may make it possible to use the Brown Company photographs for Oxford and Franklin Counties. We ought to have such assurance before commiting ourselves to the initiation of the survey in this area.

"4. Only 5 percent of Survey Unit No. 4 has suitable aerial photo coverage. Inasmuch as this unit is predominantly agricultural, possibly some cooperative arrangements can be made with agricultural agencies for photographic coverage. The approximately 5,341 square miles for which photos are needed would cost about $24,500.

"Summing up, aerial photographs will be needed for about 23,000 square miles of Maine with an estimated cost of $106,000. This is approximately half the contemplated Federal expenditure on the Forest Survey of Maine. In addition, these photographs would be available for continued use by private industry, highway planning groups, agricultural agencies, and others.

"I hope that the above provides you with useful information.

Very sincerely yours,

V. L. HARPER /S/

Director"

Considerable areas in the State have already been photographed as shown on the map, page 7. Cooperative arrangements should be made with those who have already worked large areas, in order that the State may have the benefit of the previous work, and to save duplication of effort. Information has come to the Commission that there is a possibility of other Federal Agencies becoming interested in the aerial photography of certain of the agricultural lands which would perforce include photographing woodlands particularly in Southwestern Maine.

The Commission urged and was instrumental in having a forest survey of Hancock County made. It is recommended that the State give every assistance to such aerial photography to complete maps for the entire State and that $100,000 be appropriated by the next Legislature to complete the aerial photography in the State in order that the Federal Government may have the data available for interpretation of photographs for making the forest survey. Such photographs would be available and very helpful to other State interests such as recreation, highways, and agriculture.

Reorganization of the State Forestry Department

The welfare, security, and stability of the people, communities, and industries of the State highly depend on the cooperation of forest owners and the public in measures which will continue to avoid destructive forest practices and to obtain continued yield of forest products and orderly utilization thereof. Both public and private interests should be protected, so that while communities dependent on forests be kept prosperous and tax delinquency avoided, continuous operations and forest land productivity shall be assured.

Your Interim Commission believes that forest problems discussed in other sections of this report indicate the need for strong forest policy leadership by the State.

We recommend that the administration of the conservation of the forests of the State be vested in a State Forest Commission of five (5) appointed by the Governor and approved by the Council. We suggest that the personnel of the above proposed Commission consist of 2 persons to represent forest land ownership in the Maine Forestry District, 1 to represent farm forest landownership outside the Maine Forestry District, 1 to represent manufacturers of forest products, and 1 to represent the public interest. We recommend that Commission members terms be for 5 years, but that initial appointments be for 1, 2, 3, 4, and 5 years. The Commission should choose its own chairman.

The Forest Commission should be the forest policy making body for the Department. We recommend that the Commission should be required to appoint a State Forester who is a qualified graduate of a recognized forestry school with adequate experience to handle the State forestry problems. He should remain in office subject to their approval.

The State Forester should select an adequate staff of foresters.

The members of the Forest Commission should meet monthly and hold special meetings when necessary and should receive a small per diem and expenses while on official business.

Tentative State of Maine Forest Practice Rules

Your Commission believes that the question of forest regulation is an important one to the welfare of the State.

After hearing various viewpoints on cutting controls, we have decided to present our decision in the form of a bill for the consideration of the legislature. This is the simplest of cutting practice laws, similar to the Massachusetts law. "State Forest Commission" as used refers to the suggested plan in this report under "Reorganization of the State Forestry Department."

Be it enacted by the People of the State of Maine, as follows:

SEC. 1. Declaration of Policy: Inasmuch as the forest lands of the State of Maine are one of its most valuable assets extending over about 80% of the area of the State, and extensive industries are dependent upon the products of our forests, it is in both the public and private interest to protect and perpetuate the forests of the State. The welfare, security and stability of the people, communities, and industries of the State extensively depend on the cooperation of forest owners and the public in measures which will continue to avoid destructive forest practices and to obtain continued yield of forest products and orderly utilization thereof. Both public and private interests should be protected, so that while communities dependent on forests be kept prosperous and tax delinquency avoided, continuous operations and forest land productivity shall be assured.

SEC. 2. The administration of the conservation of the forests of the State is hereby vested in the State Forestry Commission.

SEC. 3. The State Forester shall from time to time promulgate rules and regulations approved by the Commission that are not inconsistent herewith for the administration of this Act and to carry out its purposes.

SEC. 4. The State Forest Commission may appoint District Boards as it deems necessary, which shall consist of three (3) members each, shall serve without compensation but shall receive necessary expenses when on official business. The initial term of such boards shall be for one, two and

three years respectively and thereafter all appointments shall be for terms of three years, provided, however, a member shall serve until his successor has been appointed. District Boards shall elect a chairman annually and shall administer the regulations of forest practice for which provision is hereinafter made. The State Forester shall assign a District Forester to each district to assist and advise regarding the administration of the district.

SEC. 5. Every timberland or woodlot owner or operator who plans to cut on land devoted to forest purposes, except as provided in section 6, shall give written notice of his intention to the State Forester at least 30 days before he begins any cutting operation, but the notice may be waived by the State Forester in any emergency. The State Forester's staff shall examine the forest area to be cut as well as advise and assist the owner or operator in the preparation of a cutting plan that will conform to the forest practice regulations adopted.

The existing tax rate, the economic conditions in the area and other basic features shall be taken into consideration by the State Forester's staff in making its recommendations.

A member of the staff of the State Forestry Department shall inspect the completed operations to determine if the work has been executed in accordance with the plan adopted, making a report to the State Forest Commission covering the nature of the operation, the amount of product cut and other necessary information.

SEC. 6. The provisions of Section 5 will not apply to (1) cutting by any owner or tenant of any forest product for his own use, (2) clearing land for building or cultivation, (3) cutting products for sale by any owner to an amount not exceeding 40,000 board feet of lumber and 100 cords of wood in any calendar year, (4) cutting in pastures and (5) cutting for clearance, rights-of-way and similar requirements.

SEC. 7. If any timber or woodlot owner or operator is not exempt as provided in Section 6 and fails to give notice of intent to cut as provided in Section 5, he shall be assessed a fine of not more than $25.

SEC. 8. The State Forester and his staff shall consult with the District Boards and shall keep the State Forest Commission advised in connection with the administration of this act and also make an annual report to the State Forest Commission in connection therewith.

SEC. 9. (1) It is the intent that all forest land cut after the passage of this Act shall be so managed that (a) it remains continually productive of usable timber products adequate each year in amount and located to meet current needs, and with sufficient reserves to be drawn upon for national defense or other emergencies; (b) watersheds be permanently protected by vegetative cover against soil erosion, floods, and, insofar as possible, drying of streams during drought; (c) our rich wildlife resources be maintained and enhanced and other recreational features of our forest be perpetuated.

(2) *Young Growth.* So far as is practicable, all desirable seedlings and saplings shall be protected during logging operations. Except as unavoidable in logging, immature trees shall not be cut for any purpose except to improve the forest in spacing, quality, composition, or condition for restocking or to obtain timber or wood for home use.

(3) *Restocking Land After Cutting.* It shall be minimum standard practice to leave trees of desirable species of suitable size singly or in groups, well distributed, and in such numbers as to secure restocking. Except that where satisfactory and well-distributed young growth of desirable species is present and can be preserved, or where immediate planting is feasible, clear cutting may be permitted.

(4) *Partial Cutting or Selective Logging.* Since maintenance of adequate growing stock can best be attained by general adoption of partial cutting or selective logging, there shall be determined by regions or forest types the extent to which merchantable sizes of timber may wisely be left as part of the forest growing stock, and rules of the State Forest Commission shall define standards of forest practice to obtain this objective.

(5) *Individual Management Plans.* Any owner or operator may inaugurate on his own property standards and methods he considers best suited thereto, provided he carries out under competent supervision a plan of management which shall be as effective of the purpose of this Act as the general standards herein specify, and which has previously been submitted to the District Board for recommendation and approved by the State Forest Commission. These management plans shall be in a form prescribed by the State Forest Commission.

Utilization of Wood Products In State of Maine

Forest Products Reserves of Maine

The State of Maine has approximately 80% or over 16 million acres of its area in either wild land or forested wood lots. The immense reservoir of wood products is not surpassed by any State east of the Rocky Mountains or north of the Mason-Dixon line. Moreover, a major part of the forested lands in the State is unlikely to be used for any other purpose and is perhaps more suitable for a timber crop than any other uses.

The estimated amount of standing timber of the important species, according to the latest available estimate, is as follows:

Hardwood suitable for lumber: (Yellow Birch, Maple and Beech)	2,930,000,000 Bd. Ft.
White Birch suitable for novelties	2,170,000 Cords
Poplar	2,552,000 "
Hardwood Pulpwood	27,200,000 "
Spruce, Fir and Hemlock Pulpwood	42,914,000 "
Pine suitable for lumber and boxboards	4,113,000,000 Bd. Ft.

Source: Report on Timber and Pulpwood Resources of Maine, State Bureau of Taxation

In addition there is a large amount of cedar and miscellaneous woods that is used as well as an unestimated amount of cordwood available and used annually in the State.

Annual Value of Forest Products

The revenue derived from the forest products of the State represents the most valuable asset to the State aside from that of agricultural products. The gross sales values of three of the important products from the forests are estimated as follows:

Softwood lumber and boxboards	$100,000,000
Pulp and paper from pulpwood	150,000,000
All other wood products	100,000,000
	$350,000,000

Since there is a large reserve of timber products and large possiblilities in developing the use of these products of the forests it should be possible to increase the value of articles made from our wood resources two or threefold over present conditions. The State has the basic materials and with full utilization should be able to develop many varieties of final products for distribution throughout the eastern part of the United States.

Employment In The Major Forest Products Industries

It is estimated that all of the labor required in cutting and preparing all of the various types of lumber, hardwood, pulpwood, poles and other wood products require the services of 10 to 12 thousand men annually. The regular and portable sawmills in the State require about 4000 to 5000 persons to operate the various mills, and the pulp and paper industry employs about 15,000 persons. The wood turning, boxboard and wood products plants employ about 8000 persons so that it is estimated that the present employment in all of the forest industries is 40,000 to 50,000 persons. In addition the handling of the materials from our forests to the point of consumption requires a great deal of additional labor for transportation and trucking and other facilities.

Consumption of Wood Products

The consumption of hardwoods is estimated at about 800,000 cords per year without considering the fuelwood that is being cut locally and which is practically impossible to estimate. Based on the assumption that a merchantable hardwood tree will grow in about 60 years the State has a growth of about 1,800,000 cords or 1 million cords more than is being consumed. It is recognized that there has been a considerable loss of Birch and Beech during the past few years because of insect pests and parasites. The hardwoods available in the State of Maine would be greatly increased with additional woods roads.

The Pine consumed in the State of Maine for lumber, boxboards and other similar products is estimated at about 400 million board feet per year. It is clearly evident during the past few years that the Pine stands, particularly in the southwestern part of the State have been badly overcut. In this connection R. M. Evans, Regional Forester of the U. S. Forest Service, recently made the following statement:

"Taking into account all the timber in Maine; that is, both softwoods and hardwoods, and both saw timber and pole timber, the figures show that total growth exceeds total drain by about 10%. However, that comparison gives a misleading view of the situation. In saw timber trees (that is, softwoods 9" and up and hardwoods 11" and up which are the most useful and valuable sizes) the drain is roughly 150% of the growth and in softwood saw timber alone it is about 160% of the growth. On the other hand, growth exceeds drain by approximately 100% in pole timber, with an especially favorable relationship in softwood. So we find that while growth and drain are about balanced for the State as a whole there is a heavy overdrain in saw timber sizes and a compensating underdrain in pole timber."

It is, therefore, apparent that sound forest practice and reasonable regulations should be used on areas producing pine logs. This is essential in order to be assured of adequate reproduction and to produce pine products on anything like a pre-war basis.

The latest estimate on the amount of spruce, fir and hemlock pulpwood is approximately 43 million cords or at current consumption of domestic pulpwood is equivalent to about 40 years supply. Again the amount of these species is sufficient to supply our industries and perhaps enlarge them to some extent without exhausting the reserves, assuming, however, that no serious fire or insect pest losses are experienced.

Effective Utilization of the Products of Maine Forests

In the attempt to determine how the various wood products from Maine forests can be effectively utilized, many conditions and problems are involved but in general they fall into three principal groups.

1. *Improvements in Manufacturing and Marketing*

It has been pointed out that there is definitely an oversupply of hardwood in the State and where practical this should be more fully utilized. Its availability, quality and accessibility will be determining factors although future developments in the technique of utilizing hardwoods might make it possible to install small portable mills or plants nearer the source of supply. The use of hardwoods for various types of pulp is also a possibility in more complete wood utilization. The further development of hard-

wood lumber by the improvement of quality as well as the possibility of making many specialty hardwood products all come into the problem of hardwood utilization.

The uses of pine and other softwoods can be developed and further improved to get the best products and more complete utilization. For example, uniform grading and inspection of long lumber is needed for better marketing. In these species the accessible timber and pulpwood is perhaps more nearly balanced to the supply, although studies may prove that more can be made available by improvement of transportation or technical advances in the art of utilizing various species of wood.

2. *Closer Utilization*

It has been estimated that the mill waste in the hardwood turning process making special wood products amounts to as high as 75 or 80%. In the manufacture of hardwood lumber, squares and other small dimension stock the loss is exceptionally high. Moreover, the quality of the finished lumber made from hardwoods and probably softwoods should be definitely improved in order to obtain and hold markets that will be profitable to the industry. A study of the best equipment and latest methods are involved in studying this problem together with the dissemination of such information to the operators of various hardwood and softwood mills.

3. *Utilization of Wastes*

This problem is a very large and diversified field in the development of new kinds of products, processes and technique to save much of the material that is now being burned, thrown away or otherwise wasted. The possibility of using waste chips from hardwood to make a usable pulp for paper and the possible development of plastics from this material are problems that should receive consideration. The use of sawdust for alcohol and other chemical compounds is a large study in itself. These are only a few of the waste utilization problems.

In order to solve the problem of full utilization of the products of our forests, it is obvious that various studies are required to determine all of the factors involved. In general these can be divided into three classifications:

a. Study of the markets.
b. Analysis of processes and equipment.
c. Investigations into the methods of waste utilization of all forest products.

Some data are being obtained on markets of various wood products, but in many cases the development of new and improved products requires technical assistance as well as markets and distribution methods.

A central laboratory for the study of the technical problems is considered essential in order to make definite progress. Such a laboratory should have facilities for accumulating all of the valuable data on all subjects and keep it up to date. It should have research facilities to study specific problems in connection with the wood using industries of the State as well as new problems in the development of other processes and products. It should have the personnel to develop methods of disseminating the information to those industries and individuals in the State who are interested in developing or making products from the woods available in the State.

Advisory Board

An Advisory Board should be established, consisting of seven members who have a basic knowledge of the research problems and represent the broad interests of the State. The Advisory Board should be appointed by the Governor and their duties would be to establish plans and policies in connection with the laboratory. The members should be on a long term rotating basis and serve without compensation but receive expenses while on official business.

Establishment of a Laboratory

At the last session of the Legislature a bill was introduced by Senator Cleaves to appropriate $125,000 for a building for a Woods Products Laboratory. This laboratory building was to be designed so that it would serve as a headquarters for all data and technical information on all wood using industries. A preliminary layout of this building provided for a main section for general laboratories and separate wings capable of expansion to take care of experimental work in the hardwood industry. softwood industry and pulp and paper industry. President Hauck of the University of Maine has been authorized through his Board of Trustees to provide necessary land for such a building. All of the other facilities of the University, such as the chemical, mechanical, electrical, forest and other engineering departments, would be available on a reasonable basis for assistance and consultation. In addition to the building it is estimated that the minimum amount of equipment required would cost between $40,000

and $50,000 although much of this might be obtained on a trial or experimental basis from equipment manufacturers.

Operating Expenses of a Laboratory

In the operation of such a laboratory it would require approximately twenty people. The salaries and costs of the personnel and expenses of operation is estimated approximately as follows:

	Annual Salary
Director of Research	$ 7,500
2 Assistants @ $6000 each	12,000
*4 Technical men and engineers @ $3000	12,000
*6 Laboratory workers @ $2000	12,000
3 Mechanical men and workmen at $1500	4,500
3 Office employees @ $1500	4,500
Traveling expenses and general	2,500
Power, water, materials, etc.	10,000
	$65,000

*Possibly post-graduate and other students could handle this work.

Most State and government laboratories are operated on the basis of a nominal rental charge for the use of facilities. Therefore, any special problem brought in by the manufacturer would be investigated at a fee sufficient to take care of the expense of that particular experimental work. On this basis it is estimated that the amount received from any investigations of this sort would be perhaps 30 to 50% of the cost of operating the laboratory. Therefore, the net cost of operating such a laboratory would perhaps only be $30,000 to $40,000 per year.

Method of Financing Laboratory

If the State Legislature will provide $125,000 for a building and the University of Maine will provide the site, the other requirements to establish a wood products laboratory in the State would involve equipment required plus the personnel to operate this laboratory. It is estimated that the net cost should be not over $65,000 for the first few years, including necessary additions to equipment, and then the returns from experimental work might enable a reasonable expansion without any additional cost to the industry except for the study of specific problems in which they are interested. The net amount of $65,000 per year could be raised on a cooperative basis similar

to the methods used by the potato growers and other groups in the state. It is understood that when a majority of interested concerns or individuals agree on a reasonable assessment the State will make such assessment for the specific purpose for which the assessment is made.

A substantial number of the concerns manufacturing hardwood and softwood lumber as well as novelties have expressed their willingness to be assessed in connection with this project. A possible basis would be assessments on hardwood lumber at a rate of 12c per M and on soft wood lumber at 10c per M. The hardwood and softwood novelty assessment would be on the basis of 5c per cord. The above schedule of assessments would be considered in the event a laboratory building was constructed and the project started on the basis as previously outlined.

From experience it has been found that governmental and other laboratories located at long distance do not effectively serve the State of Maine in its particular problems. Some large industries obtain limited advantage but it is essential to be near the source of materials to obtain the best technical results.

The Forests Products Laboratory at Madison, Wisconsin, has done much general experimental work on forest products of all kinds and also developed some special processes that have been put into use on a commercial basis. Many of the problems in Maine are similar to those investigated at Madison but in most cases lack the specific application on a local basis that will enable the small or medium sized concern to apply the results of their studies to its own particular business. To be fully successful any experimental work must be closely coordinated with the project that is being developed in order to perfect the process on a successful commercial basis. Obviously the smaller companies cannot afford the time and expense of going to Wisconsin with their problems and very little can be accomplished by correspondence. Eleven states have already established their own laboratories for the study of wood problems which is further proof of the value of state laboratories. Many of these States have smaller forest resources than Maine.

The State of Maine should establish its own "Wood Products Laboratory" to assist in the development of the present resources of its forests.

Some Research Problems for a Maine Wood Products

It is recognized that a vast amount of experimental work has been done on all wood products and their deriva-

tives. A central laboratory is essential to accumulate this information, carry on further developments and, what is of greatest importance, assist in the dissemination of technical data to the industries and concerns desiring to use such information. In this way the wood using industries will be developed and maintained on a permanent basis.

The following list of possible activities is not complete but indicates the scope and type of research problems.

Manufacturing Techniques for Lumber, Novelties, Turnings, etc.

1. Standardization of lumber grades
2. Seasoning
   a. Air seasoning
   b. Kiln drying
3. Marketing of wood products

Testing Work

1. Strength of various woods
2. Other physical characteristics
3. Tests of equipment

Various Kinds of Wood Waste

A. Use of Slabs, Edgings, Etc.
   1. Dimension stock and squares
   2. Short lumber
   3. Box and crating stock
   4. Mechanical fiber
   5. Hardwood distillation
   6. Softwood distillation and extraction
   7. Pulp products
   8. Tanning and dye extract
   9. Industrial alcohol

B. Use of Sawdust and Shavings
   1. Gas producer fuel
   2. Briquettes for fuel
   3. Composition floor products
   4. Concrete products
   5. Stuccos and plasters
   6. Gypsum compositions
   7. Clay products
   8. Moulded articles
   9. Wood flour
   10. Packing
   11. Wallboard
   12. Heat insulation

13. Floor sweeping compounds
14. Gas purification
15. Wallpaper
16. Filtering oil
17. Waterproofing mixtures
18. Distillation
19. Extraction
20. Tanning extracts

The products of the Maine forests are treated in so many different ways and finally become a part of such a vast number of paper and allied products that it is almost impossible to determine the countless problems involved in the successful development of these products. The study and improvement of softwood lumber, hardwood products and by-products, as well as pulp and paper technology in Maine, is basic since this State now has and will doubtless always have the resources of its forests which should be used to the utmost advantage.

WOOD PRODUCTS RESEARCH CENTER

The Commission recommends that a "RESEARCH SERVICE CENTER" for wood products be established in 1947 since the possibility of financing and building a laboratory in the near future represents a major problem. The fundamental reason for this recommendation is that there is an immediate and vital need for information regarding wood products and the interpretation of available data on research and development work. This woods products research center could employ a personnel of about six to obtain and correlate all possible data on research work that has been been or is being done in connection with wood products. Their work would primarily consist of a study of the lumber, wood turning and other related industries but could be extended to other fields in connection with utilization of waste materials. Field representatives should be available to contact concerns and industries who are interested in the various new processes and procedures that are available. Standardization of grading rules and marketing methods for hardwood and softwood products should be a major field of activity.

It is estimated that it would cost $25,000 to $30,000 per year to operate such a research center. It is suggested that the financing of this research center be on a basis similar to that recommended for the laboratory at a re-

duced rate. The pulp and paper industry have signified their willingness to participate in this work and will make a contribution which will represent their reasonable share of the activity of this research center. The benefits to the general public resulting from a research center make it advisable for the state to contribute toward the cost of operation.

An Advisory Board from the industry, the University, and the public should direct the policies of the research center. At the end of two years it should be possible to determine more accurately the specific problems and research work that might be undertaken by a laboratory which should replace the research center.

Forest Taxation

Your Commission finds no difficulty in the present tax system so far as lands in the unorganized townships go; values are conservatively fair and the rate low. Your Commission does find a definite problem in the instance of taxes being borne by forest lands in organized municipalities. It finds that rates are variable and often extremely high; that while values are sometimes kept low, the result of the application thereto of high rates results in such a tax burden per acre that forest land has ceased to be an investment for private owners.

We consider that this situation has definite bad social as well as individual implications, inasmuch as the taxes levied have compelled utter stripping of the timber from the land and, in some cases, reversion to the communities of areas which can return no income from timber for several generations. This situation is becoming intensified and more widespread. Such situations can not only cause a deterioration of the community but may result in deprivation of wood-using industries of stock to maintain employment rolls; a still further result, caused by lack of opportunity for more aggressive young men and women, is the leaving of such communities by the more stalwart people to seek better opportunities elsewhere.

Your Commission is of the definite opinion that some steps must be taken by the State to remedy this situation immediately and it calls to your attention the following possibilities:

(1) Forest land taxation in the organized municipalities where there are local needs is at present based on those needs rather than on the productive power of the land. This situation should be remedied so that the real measure for the tax will be the income which the forest land is capable of producing under normal markets. In other words income should be capitalized to arrive at values.

However, if through State assistance, a moratorium is declared on the taxation of forest land awaiting such income, then to protect the State and the various communities, some measure of State control over cutting practice will be necessary; otherwise there will be nothing to prevent a land owner taking advantage of such a moratorium and eventually stripping his land to the detriment of the community and of the State.

(2) Your Commission is of the opinion that very definite economies can be made in costs of local government by the grouping together of many of our organized municipalities. It believes that such grouping will not only act to reduce immediate costs, but over a period of years will result in better services and in greater efficiency. Your Commission, however, does not believe that this process will advance rapidly enough unless the State government offers definite incentives and leadership. We recommend that the State tax assessor or some other State department should be authorized to study possible savings from town groupings and suggest incentives to bring voluntary groupings about.

(3) During the past dozen years there has been a considerable drift of organized municipalities into unorganized townships. This has resulted in a lessening of taxes for the communities which have de-organized and given up their local governments, with the State as a whole, of course, assuming a part of the burden. There are still many forest towns of sparse and shrinking population and with a comparatively low tax base, which can well be deorganized. If such communities after deorganization become again prosperous and growing, new local charters may be taken. However, we believe that instead of the somewhat haphazard decisions on deorganization now being followed, more leadership is required from the State in order to bring about reasonably rapid and salutary results. Your Commssion advises that a special committee of the next Legislature be set up to study this particular problem and report on same. This procedure should take into consideration the recommendations made in Possibility No. 2. above inasmuch as a Legislative Committee so set up may decide to recommend the grouping of some of these depopulated municipalities with other municipalities rather than having all of them become utterly deorganized.

(4) Your Commission calls attention to one inequitable situation which prevails in the unorganized townships, i. e.: The carrying of the burden of road construction and maintenance through unorganized townships by only the property abutting on that particular roadway. Illustratively, a road may be built through an unorganized township, the taxes are all borne by that township, but the road usually serves a far wider region. Your Commission is of the opinion that the spreading of this tax burden should be over the region served, or over the county, or over the state as a whole. It is decidedly of the opinion that it

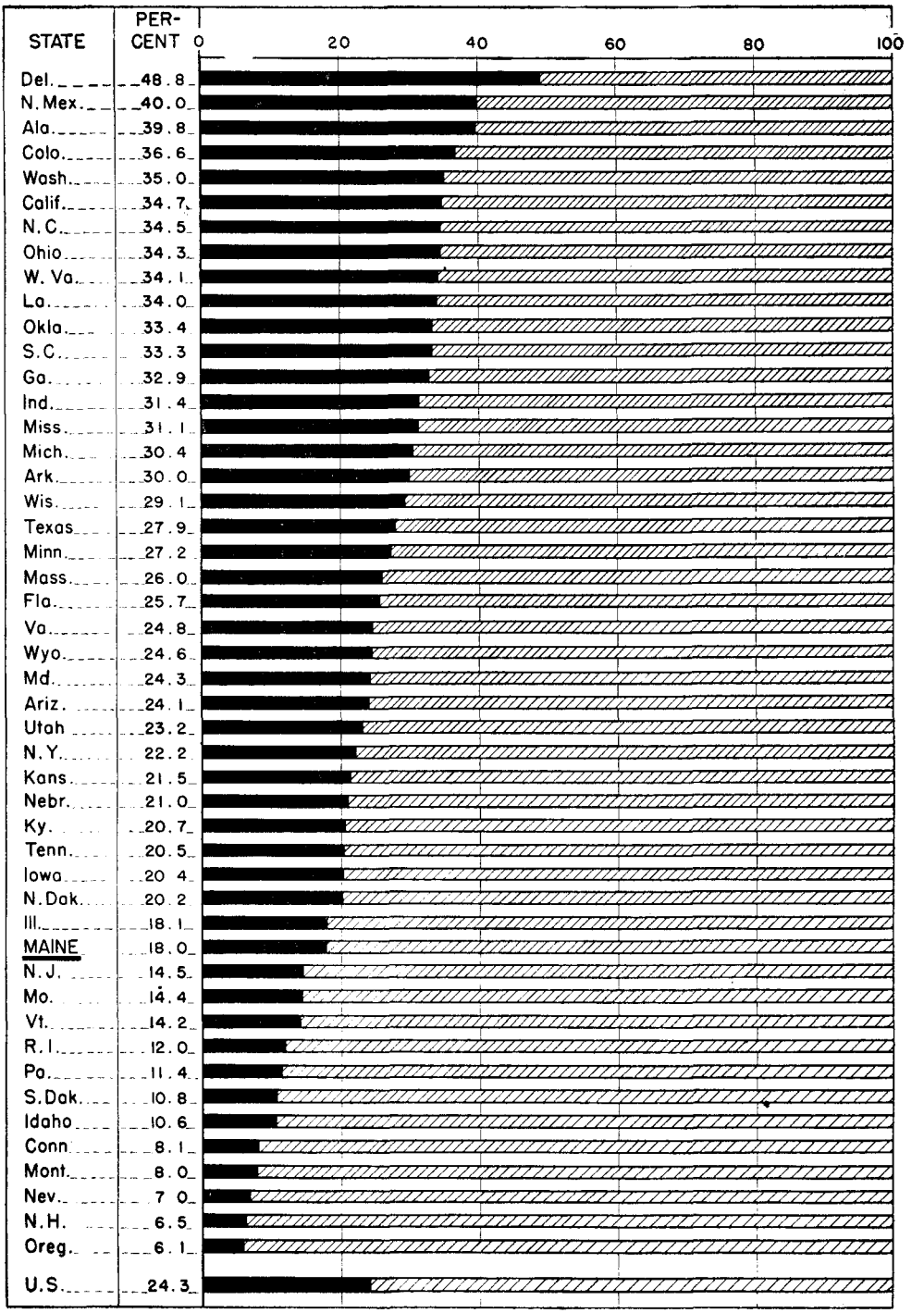
is unjust, under present road costs of construction and maintenance, to levy the tax against the abutting property only.

(5) At the present time wood in transit is taxed to the community in which it will be manufactured or the state headquarters of the manufacturing concern. This causes injustice to the community where the timber is produced and to the operators. For example, a city in the southern part of the State may receive tax for wood grown on land in the northern part, when it is in transit. The operator of the wood desires improvements in the roads in order get out the wood; the local community says that it should have the tax from the wood in transit if it is to maintain hauling roads. The Commission recommends that the tax on wood in transit should be clarified and that, if a tax is to be assessed, it should inhere to the community in which it is produced.

(6) Your Commission is driven to the opinion that the State government will have to assume more of the burden now being carried by real estate in the municipalities, particularly those largely in forest land. The various services demanded by society have increased tremendously and are still increasing, with commensurate increases in costs. Your attention is called to matters such as town road maintenance and snow removal, additional help in schools, and general welfare work in aid of the indigent. Your Commission is of the opinion that additional aid by the State along these lines should be used as an incentive to convince towns to join together under a common local government, or to deorganize. The accompanying chart taken from U. S. Forest Service Tax report on Hancock County illustrates that the State Government in Maine is far behind most States in providing aid to local communities. (See page 27)

(7) Your Commission believes that one of the problems in forest taxation is the lack of trained assessors and their impermanency of office. It believes that if the above suggestions on grouping of towns is carried out, trained assessors would be possible for each group of towns. Instruction could then be given to assessors by the State tax assessor, leading to a fair and equitable assessment over all classes of property. A trained assessor is especially important in the case of forest land. We believe that trained forest land tax assessors should be available for hire by towns. It is our opinion that the State tax assessor should either have men on his staff or be able to recommend personnel suitable for this work.

PERCENT OF LOCAL REVENUE DERIVED FROM STATE AID



Forest Protection

Productivity, or best use of any forest land, must be predicated on adequate protection of the forest against fire, insects and disease, for without such protection against natural enemies any consideration of cutting practice regulations or improvement of utilization of forest products is futile.

Forest Fire Control

The forests of Maine have approximately 16,750,000 acres. The Maine Forestry District includes 10,000,000 acres, the forest protection being under the direct administration of the Forest Commission. The remaining 6¾ million acres lie outside the District and are under the jurisdiction of local municipal governments.

The Maine Forestry District was organized in 1909 for the purpose of centralizing fire protection on the wild lands of the State. Assessments are made on all of the lands in the District to create an annual fund which can be used only for fire protection. It was the outgrowth of cooperative efforts on the part of individual landowners and served the purpose both of bringing many individual fire-fighting activities into one organized unit, as well as making contributions mandatory on the part of all landowners. The success of the undertaking during the 37 years of its organization is well demonstrated by the fact that in recent years the average area ruined by forest fires has been less than 15/100 of 1% of the forested area in the District. At the present time the District owns about $500,000 worth of facilities including warden buildings and camps, 77 lookout towers, 2500 miles of telephone lines, ten 2-way portable radios, and 4 mobile radio units on supervisors' cars, etc. The equipment includes one airplane, supplementing others hired for emergency use, 57 pick-up trucks and numerous power pumpers, and miscellaneous hand tools.

The operating expense of the Forest District of course depends in a large part on the number and size of forest fires experienced in any given year. For the 1943-44 period total expenditures averaged $223,251. Receipts to cover these expenditures were raised by general assessment on the land in the District amounting to $133,994 for each of the two years. Funds were received from the

Federal Government under the Clarke-McNary Act to supplement this assessment to the extent of $59,722 in 1943, and $76,587 in 1944.

The Federal allotment of Clarke-McNary funds to the State is based upon a complicated formula taking into consideration acreage burned, acreage protected, State costs of suppression, together with various credits given adequacy of equipment. A 50% reimbursement is allowed on all items which are a direct charge to forest fire protection, together with a proportionate part of the overhead of the Forest Commissioner's office. In general however, Federal participation will not exceed the amount appropriated by the State for these purposes. During the fiscal year ending June 30, 1946, $135,929.00 was received from the Federal funds. This was divided, $117,637.60 to the Forestry District and $18,291.40 to organized towns. This figure approaches closely the amount of money appropriated by the State. It is extremely doubtful whether we will obtain additional Federal funds until such time as the Federal appropriation is increased.

In the 6¾ million acres of forest land outside of the Maine Forestry District, the State provides so-called County Fire Wardens to cooperate with officials of the various municipalities in combating forest fires. In this area there are only 19 lookout towers, widely distributed, and about 50 miles of telephone line. The State also provides one Supervisor, four full-time wardens, plus 13 seasonal wardens available with State fire-fighting equipment. However, no State Warden is allowed to take charge of a fire in the organized towns unless specifically deputized by the municipal authorities to do so. By law, in other words, forest fire protection in organized towns is a function of the town officials. The last Legislature provided that the State may pay up to one-half of the suppression cost of fires in organized municipalities and appropriated an annual sum of $25,000 for that purpose.

The lack of lookout towers, equipment and adequately organized man power in the organized towns as against the well-organized and well-equipped Forestry District is brought out forcibly in the statistics below covering the average of the past ten years.

10-year Average	*Maine Forestry District*	*Organized Towns*
Fires	111	145
Areas burned	3811 acres	7859 acres
Damage	$26,843	$67,929.

It is recommended, that the State furnish further assistance through State funds for the suppression of fires in organized towns. It is estimated that to equip the various organized towns to a degree equal to that of the District, $108,000 is needed for lookout towers, storehouses, power pumpers, hose, trucks, etc. It is recommended that the State appropriate $10,000 for this purpose to be spent annually, provided the individual municipalities involved will match either individually or collectively the funds to be spent by the State on a 50-50 basis.

It is estimated that additional warden and supervisory personnel should be provided to the extent of $27,000 per year in order to provide coverage equal to that of the District, to include two supervisors, 20 watchmen (seasonal), two district wardens and four deputy wardens. *It is recommended* that the State appropriate $27,000 for this purpose provided that the Forest Commissioner may have some control over the appointment of the municipal fire warden either by direct appointment with approval of the local selectmen, or by appointment by the selectmen with approval of the Forest Commissioner. This is necessary not only for adequate control of the expenditure of the State funds by the municipality, but it is necessary in order that the State may qualify for reimbursement by the Federal Government under the Clarke-McNary Act as previously described.

If these recommendations are carried out the funds available for forest protection in organized towns will be:

Present appropriation approximately	$29,000
Federal Funds available	15,000
Saw Mill Fees	2,500
A 50-50 Fire Fighting Fund	25,000
Sub-Total	71,500
50-50 Equipment Fund	10,000
Additional Personnel	27,000
Total	$108,500

On this basis there would be available for forest protection in the organized towns approximately $16.00 per year for each thousand acres of forest land. This compares with $21.00 per thousand acres available in the Forestry District and seems entirely reasonable and necessary. It should be noted that if additional funds are provided by the State for fire protection and suppression in organized towns, there will be a substantial increase in

the participation by the Federal Government which will tend to lower the expense as noted above.

Forest Insect and Disease Control

Forest insect and disease control depends upon early discovery of insects and disease damage. Many times technical information is lacking on the exact methods of controlling insects and disease, and intensive studies must often be instituted and continued so that control methods may both be discovered and made available before outbreaks reach the epidemic stage. The insect control division of the Maine Forest Service comes under the head of a State Entomologist and operates under a State appropriation. The appropriation for this division is usually low except at times when the forest insects show up in epidemic form as in the case of the Spruce Budworm, European Spruce Sawfly, Bronzed Birch Borer, etc, The only source of funds at present is the State budget. In cases of severe epidemic, such as the Spruce Budworm which ravaged the Maine forests during the 1910-1920 outbreak and which destroyed many more acres of wood than have all of the fires in recent years, the threat to the welfare of the people and industry of the State may well be calamitous. To assure the availablity of proper technical information for detection and control and to insure the availablity of adequate funds for those purposes, *it is recommended* that the Maine Forestry District law be broadened so that assessments may be made on the District for the purpose of contacting and supervising not only fires but any other potential threats to our forests. The law should be broadened to cover all phases of forest protection, and not be limited to fire protection.

In this connection it should be pointed out that the Bronzed Birch Borer and Beech Scale have destroyed nearly all of the beech and yellow and white birch east of the Penobscot River, and devastation is continuing on a smaller but growing scale in the central and western part of the State. We are faced with another epidemic of the Spruce Budworm which has already destroyed large areas of spruce in Canada and which is moving relentlessly eastward. At present there is spent an approximate $16,000 per year for forest inspection, rangers and other phases of a detection service so that the State may be informed as to the current condition of our forest land as regards insects and disease hazards now present. This work should be extended and *it is recommended* that the present appropriation be increased to $20,000 per year.

Development of Woods Roads

Adequate protection of forests from fires, insects and diseases is intimately associated with sufficient road or other transportation facilities. Forest fire suppression is greatly facilitated by proper road systems which allow quick transportation of men and supplies to fires. When insect and disease infestations assume epidemic proportions, it is impossible to salvage dead timber before it decays and becomes useless for market without roads. In case of the Bronzed Birch Borer infestation, which is reported to have killed nearly two thirds of the birch in Maine east of the Kennebec River, lack of transportation facilities has led to the loss of considerable quantities of birch which might have been salvaged, had roads been available in the unorganized townships of Maine.

The forests of the State are again threatened with another insect infestation, that of the Spruce Budworm, which in 1910-1920 killed several million cords of spruce and balsam fir, much of which could not be salvaged.

If Maine industries are to survive in their competitive position with similar industries in domestic and foreign trade, it is necessary that great timber losses of this nature be averted as much as possible, and if protection is not entirely possible, at least it should be possible to salvage material which is killed by fire, insects or disease.

A committee working on the Spruce Budworm problem estimates that 500 miles of primary roads are needed in unorganized areas of Maine in case timber salvage becomes important. The Commission also wishes to point out that roads make timberland more productive and valuable because of accessibility.

The construction of such roads raises problems, not the least of which is that of cost, taxation to pay for the construction, exact location, public use, etc. The Commission feels that this problem is one which is important. We recommend that a specal legislative committee or some other committee should be instructed to prepare, with the assistance of the Maine Highway Commission a long range program for the development of woods roads in Maine.