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Recognizing and Measuring Forest Values

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First, let me thank you for inviting me here today to discuss the scope of research being conducted by forestry economists in the northeast. This discussion will be directed principally at research designed to aid the allocation of forest outputs as related to forest-resource planning.

Before launching into my main topic, perhaps a brief explanation of what a forestry economist is, what he generally does, and for whom is in order. Most forestry economists were first foresters -- that is, they had professional undergraduate training in forestry. Forestry economists enter this discipline in their graduate training and in doing so, place major emphasis on course work in economics. Forestry economists may direct their attention to a single or a variety of specialized interests within the discipline. There are approximately a half dozen schools in the country producing forestry economists at the doctorate level. In the northeastern states there are not too many forestry economists. Maine, Massachusetts, New Hampshire, and West Virginia have one each at their state universities. The Yale and Harvard Schools of Forestry have one each. New York has the largest concentration at the State University, College of Forestry at Syracuse University with approximately six people in the Department of Forestry Economics. The other single major employer of forestry economists is the Northeastern Forest Experiment Station which employs four to five people engaged in a variety of research projects in this field. A forestry economist is also employed at the Federal Reserve Bank of Boston, although his interests are not restricted to forestry matters. At present there are only about a dozen in the northeastern states although there are individuals engaged in forest marketing who are not trained forestry economists.

Up until about ten years ago, the forestry economist was primarily concerned with only one output of the forest -- one good or service -- that being timber. His concern was almost exclusively with timber production, i.e., growing the tree, and to a lesser degree with the economics of the wood industry. Most notably, forestry economists prepared reports of the timber situation in individual states and in the United States as a whole, an endeavor assigned to the Forest Service, U.S.D.A. by legislation. This work has been conducted as a part of forestry economics research at the Regional Forest Experiment Stations. On a larger scale, the Forest Service has made a series of national appraisals starting in 1920 with the Capper Report. This was followed by the Copeland Report in 1933, the Timber Reappraisal following World War II, the Timber Resources Review published as Timber Resources for America's Future, 1958, and most recently Timber Trends in the United States in 1965. In general, these last two predictions of future timber requirements have been based on projections of GNP and population as related to past consumption patterns. Current timber supplies have been evaluated but little attempt has been made to estimate future supplies in light of the changing price structure of wood and the changing technology in the wood industry.

In dealing with the timber product, the forestry economist has faced problems which are rather unique to this product as compared to others in the economy. One of these is the relatively long period of time required to produce this crop. For this reason, forestry economists, as well as foresters in general, are quite familiar with the interest rate and its application to compounding, discounting, and capitalizing investments. Placing values at one point in time, for purposes of comparing them, is a necessity for tree crops which require such a long period of growth before harvest. Another point of difference from much of the rest of the economy, but perhaps not so unique, is the rather low rate of interest earned on investment in timber capital. Fortunes made from timber

were achieved by speculation by the so-called lumber barons -- not by investing in growing the timber crop from beginning to end. A third somewhat unique aspect of timber is that it is both machine and capital. Thus, when the forest is cut, capital is removed and the machine is no longer available to go on producing. Some agricultural products are also of this nature, but it does not require as long a time to reconstitute the machine.

I have discussed timber products of the forest but have said nothing about their value, particularly how this value is measured. Admittedly, the measurement of forest products is rather vague and indefinite. The board foot and the cord are standard volume measures employed by both sellers and buyers. However, these measures have numerous variations. For instance there are a number of different log rules, each different in its measure of board foot volume. To measure a standing tree one needs to know the diameter breast high and the merchantable height in logs. These two measures are relatively easy to obtain, but then, they must be applied to a volume table in which the form class of the tree is considered. This form class may vary from tree to tree and usually only one form class is employed for all trees in a given area. If you compound this with the variety of log rules, a great deal of variation could result in measurement of tree volume. This is not as bad as it may seem, for certain rules are usually standard for a region either by custom or legislation. At least volume is measurable and if volume is known, it has a value in the market place -- a price. It may be concluded that even though the measurement of timber products is not well defined, these products do have a place in the market system and thereby are priced in monetary terms.

More recently, the forestry profession has become actively concerned with the entire scope of forest goods and services. I say "actively" because for many years a variety of forest-resource uses have been recognized and the profession has talked and written about them, but they have not been too concerned with their allocation. With the increased pressure to produce all goods and services that the forest is capable of yielding, the forestry economist faces a new situation of some uniqueness to the forest. This uniqueness stems from the value problem of outputs of the forest, exclusive of timber values. In short, many values derived from forest recreation and aesthetics, wildlife, and watershed outputs are not expressed in the market place in monetary terms. In order to allocate forest-resource uses, the values must be first established and secondly they necessarily must be comparable for purposes of allocation.

Not only is there a problem of measuring the values of forest outputs but, as I have indicated in the title of this paper, recognizing what the values are is the initial problem. In order to be more specific, I would now like to consider some research which is being conducted that is directed at recognizing and measuring forest values. Probably the most direct approach, is to consider the supply and the demand for forest goods and services.

The greatest proportion of our northeastern forests are owned by what is commonly referred to as the "small acreage forest owner." There are vast numbers of owners, each with a different background and each having a particular goal in owning forest land. These people may be farmers, store clerks, professionals, merchants and so on. They are not only varied in their interests but the sizes of their properties range from a few acres to several hundred, with some few owning in the thousands. If the forester wants to manage the forest resource, and plans to allocate its outputs for purposes of resource planning, he must know what kinds of values are placed on the forests by this majority ownership. Certainly this is no small problem, nor is it one easily studied.

A recent study in Berkshire County, Massachusetts undertook to gain some insight into forest values from the owner's standpoint. The question that most nearly approached recognizing value was one which asked owners their primary reason for owning forest land: Of the 1,927 owners responding to the question, 54 percent indicated personal recreation, 41 percent satisfaction of owning land, 40 percent ownership for residence, and 34 percent timber production. Wildlife development and nature study-conservation showed 28 and 25 percent response respectively. This data was gathered by use of a mail questionnaire which was commercially printed, compact in design, and provided for return mailing. The 1,927 returns represent a 45 percent response (40 percent of the privately owned forest land area), although 51 percent were returned but not in time to be included in the analysis.

General conclusions from this study, in a limited area with a somewhat unusual ownership because of large estates of wealthy landowners, are that the value placed on this forest land by owners is not measured in monetary terms. The value measure is more one of satisfaction, self-indulgence in the natural realm, and perhaps in a few cases there is a feeling of the need to provide for the well-being of society. Certainly the objective is not primarily monetary return when only 34 percent are interested in the land for production of an output measured in monetary terms. Knowledge of this forest owner viewpoint explains in part the slow progress in attempting to promote timber production through a number of state and federal programs which have emphasized the financial advantages from timber production. Timber growing is not in many cases the owner's goal and, therefore, why should he invest inputs to produce this crop even though enticed by subsidization in the form of governmental transfer payments. What we can learn from this study is that we need to take a critical look at our various educational, subsidy, and technical service forestry programs.

A good deal more could be said on this topic, but I shall go on now and look at the demand side. On this side of the picture we have an even more diverse group of people which it is necessary to understand in order to properly allocate the uses of the forest resource. Again, the problem is to recognize the values that forest users place on the forest and attempt to measure these values. I am afraid foresters tend to look at the forest in their own value terms and not those of owners or users.

A well known study of the general public and their demands for outdoor recreation, including forest-oriented recreation, was conducted by the University of Michigan for the Outdoor Recreation Resources Review Commission. More recently, a study has been initiated in the northeast that focuses on particular forest-oriented recreation activities. Some of you are involved in this study. Two activity-oriented consumer groups are being studied in detail -- hunters-fishermen and campers. Let me briefly describe what is being done in each.

The hunters-fishermen study is being conducted by six states -- Maine, Massachusetts, New York, Pennsylvania, Vermont and West Virginia. As in the case of the landowner study mentioned earlier, a standard mail questionnaire is being employed by all states. In fact, we copied the format of the owner attitude study because it worked so well. The sample is drawn from license holders in each participating state. The size and method of drawing the sample is up to each station and is not specified by the regional technical committee. Uniform letters of transmittal have been used and each of the three mailings have been sent out at approximately the same time by all states. A regional coding system is developed for the purpose of committing the information to three data processing cards for each respondent.

In a pre-test of the questionnaire response was very favorable, up to as much as 65 percent return with one mailing. It appears that we will achieve about the same percentage response with three mailings. Pennsylvania reports 41 percent response,

Maine 65 percent, and in Massachusetts we have achieved 62 percent after the third mailing has been out two weeks. Some of us are wondering if the fact that the questionnaire is printed tends to scare people away from answering it because in the pre-test it was mimeographed and we had nearly as good response with one mailing. Our relatively high response may be attributed to the fact that we are surveying a select, interested population.

Some non-respondents will be interviewed to determine if there is a significant difference between them and the respondents. Analysis of the data will be uniform for the region although individual states may make any further analysis desired.

The study of campers has not progressed as far as the hunters-fishermen phase. A number of camper studies have been conducted throughout all parts of the country in recent years and the participating stations did not want to duplicate these studies. The approach being used in this phase of the regional project is to define geographical market areas and then to develop demand projections within these areas. The work of defining the areas is being undertaken at the Forest Service's Forest Recreation Laboratory at Warren, Pennsylvania. A map that resulted, showing all campgrounds in the northeastern states, looked as if it had been hit by a shotgun pattern of rather uniform distribution. No market centers were evident and it would seem that additional criteria would be needed to define market areas.

Because of time limitations, I have painted a very broad picture of some of the research designed to provide insight into the values that suppliers and consumers of forest goods and services place on them. Emphasis has been chiefly on recognizing values rather than measuring them. The reason for this is that many of these values are subjective as opposed to objective values which may be more readily quantified. A few attempts have been made to quantify some forest goods and services by employing exchange values. One such attempt was by a graduate student at the University of California who expressed the value of land given over to forest recreation in terms of the site's potential timber productivity. My general inclination is to proceed slowly along this line of objectively evaluating uses because as the many and varied outputs of the forest become more scarce, they may assume a market value. If this happens, and it has with some types of forest-oriented recreation, problems of allocating forest outputs may become at least readily comparable, if not more simplified.

I do not want to leave you with the impression that forestry economists are engaged only in working out value systems. On the contrary, their work is varied and I have chosen this topic today because of its relative importance to forest-resource use of planning. Many forestry economists are working on the development and applications of models for timber production as well as multiple forest uses. Others are concerned with management simulators, such as the one developed by Dr. Ernest M. Gould and others at the Harvard Forest. Other studies in the forefront of forestry economics research are the factors affecting location of wood industry and the marketing of wood products. The forest resource aspect of regional planning and the application of benefit-cost analyses to this work is being conducted at the Northeastern Forest Experiment Station, Upper Darby, Pennsylvania. At the University of New Hampshire, a forestry economist is involved in a study of the economic impact on a local community of intensive forest-oriented recreation development, in this case a state park.

From my talk, you might conclude that there are relatively few forestry economists; that we are spread rather thin in relation to the many problems that need answering; and, that some of the things for which we would like to obtain solutions are not too definable.

Those of us who are teaching forestry economics are attempting to make all foresters more conscious of the social and economic influences on forest-resource use. These factors are becoming increasingly important in forest-resource planning and foresters must deal as efficiently with them as they have biological criteria for decisions in the past. If all foresters have an appreciation for the role of the social sciences in forest-resource-use planning, considerations in the management of this resource will have a still more significant base.