Labor: The Key to Ontario's Silvicultural Program¹

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Abstract

The demand for labor for Ontario's regeneration program is forecast to increase from 114,000 man-days in 1973-1974 to 187,000 man-days in 1982-1983, a rise of 64%. Most of this demand is expected to be centered in northern Ontario. Projected population estimates for 1981 and beyond, coupled with other interacting factors, strongly suggest that sufficient labor may not be readily available for the level of regeneration activity proposed.

Résumé

La demande de main-d'oeuvre nécessaire au programme de reboisement de l'Ontario devra augmenter, prévoit-on, de 114 000 jours/hommes en 1973-1974, à 187 000 en 1982-1983, soit une hausse de 64%. La plus grande partie de cette demande sera concentrée au nord de la province. Les estimations prévues de la population en 1981 et par la suite, jumelées à d'autres facteurs connexes, suggèrent fortement que la main-d'oeuvre nécessaire pourrait bien n'être pas suffisante pour effectuer tous les travaux de reboisement proposés.

Introduction

In recent years the shortage of labor in Ontario's resource-oriented industries, particularly in northern Ontario, has emerged as a major problem demanding immediate attention and early resolution. The problem is not restricted to the primary industries but is of equal importance to those concerned with the silvicultural management of public forest lands. Without an adequate labor supply in the right place at the right time, most well-organized and well-planned silviculture programs cannot be executed successfully.

Labor is undoubtedly the key to a successful silviculture program. Unfortunately, it may also prove to be the most serious constraint faced by the resource manager. Ontario is at present attempting to establish its most ambitious forest management program in some of the more remote parts of the province (Anon. N.D.b) at a time when the forest-based industries are having problems attracting woods labor (Day 1973, Ballantyne 1975, Anon. 1976a). This situation strongly supports the argument that availability of labor is, and will continue to be, the most important element in the forest management equation.

To focus attention on silvicultural labor, estimates of labor demand are made for 1973-1974 and 1982-1983 to illustrate the current and expected magnitude of the demand. While comparable estimates of supply are not made, an analysis of the factors affecting it, including associated problems, is presented. The discussion of demand focuses primarily on regeneration activity since it is currently the largest component of Ontario's silviculture program (Anon. N.D.b). However, demand for labor for other silvicultural activities such as tending is significant (Anon. N.D.b), and may even increase at a rate greater than that for regeneration with the establishment of artificially regenerated stands.

Demand

To illustrate the relative importance of labor in the Ontario Ministry of Natural Resources (OMNR) silviculture program, one has only to consider that in 1973-1974 almost 70% of total expenditures on silviculture were for wages, with casual labor wages representing 82% of the total wage bill (Anon. N.D.a). Since there is little doubt as to the importance of labor (particularly casual labor) in the current silviculture program, questions arising about demand such as "What is the expected demand for labor in the future?" and "To what extent will traditional sources of supply be available to meet the demand?" become critically important.

OMNR regeneration program projections (Anon. N.D.b) for the years 1973-1974 and 1982-1983 were used to estimate the expected change in demand for labor during the intervening period. The number of acres to be treated and the estimated man-day requirements per acre for different silvicultural treatments are presented in Table 1. The estimates of man-day-per-acre requirements are based primarily upon personal work experience and that of colleagues. Data on the number of acres to be treated, identified by type of treatment and location, were prepared by OMNR.

The estimated man-day requirements by silvicultural treatment for 1973-1974 and 1982-1983 were presented in Table 2. Indications are that, over the 10-year period, demand for silvicultural labor for regeneration activities is expected to increase by 73,000 man-days from 114,000 in 1973-1974 to 187,000 in 1982-1983, an increase of approximately 64%.

The estimates in Table 2 indicate several other interesting features of demand. First, the demand for labor for planting will continue to dominate. However, over the 10-year period the regeneration program will become more diversified. In fact, about 37% of the increased labor demand will be for activities other than planting. It is estimated that man-day requirements for planting

¹Paper presented at the Plantation Establishment Symposium Kirkland Lake, Ontario, September 21-23, 1976.

Table 1. Estimated number of acres proposed for silvicultural treatment for regeneration purposes by treatment type and region, 1973-1974 and 1982-1983

Administrative Regions of the Ontario Ministry of Natural Resources											Estimated man-days per acre ^a
Treatment	Year	North- western	North Central	Northern	North-eastern	Algonquin	Eastern	Central	South- western	Total Ontario	
(Acres)											
Planting bare-root.....	1973-1974	8,334	16,620	21,980	7,962	5,427	6,000	3,998	2,716	73,037	1.25
	1982-1983	5,500	25,250	26,697	10,141	9,550	12,400	4,815	5,167	99,520	1.25
container.....	1973-1974	30	965	2,798	949	—	—	—	—	4,742	0.83
	1982-1983	2,320	5,890	9,000	3,037	—	—	—	—	20,247	0.83
Seeding.....	1973-1974	6,167	3,121	9,849	5,836	121	—	5	—	25,099	0 ^b
	1982-1983	14,146	11,200	19,894	7,132	894	—	30	—	53,296	0 ^b
Modified harvest cut.....	1973-1974	—	1,335	149	1,950	14,975	712	25	—	19,146	.13
	1982-1983	7,950	75,000	16,797	4,981	22,260	5,850	—	—	132,838	.13
Scarification....	1973-1974	4,529	3,588	37	920	52	—	50	—	9,176	.125
	1982-1983	14,616	9,700	8,206	3,690	1,023	500	25	—	37,760	.125
Site preparation for planting and seeding..	1973-1974	11,987	27,372	35,321	10,250	880	2,316	968	70	89,164	.125
	1982-1983	39,417	63,770	55,843	18,832	6,950	8,430	1,939	1,150	196,331	.125

Source: Anon. N.D.b.

^aA man-day is defined as 8 working hours excluding lunch but including rest breaks.^bNo estimates available.

bare-root stock will increase in absolute terms by 36% over the period; its standing relative to other treatments, however, will decrease significantly from about 80% of total man-day requirements in 1973-1974 to 66% in 1982-1983.

Second, the demand for labor will vary widely across the province and between regions. Projec-

tions for the OMNR Northwestern and North Central administrative regions combined indicate that this area will have the largest labor requirements followed closely by the combined demand of the Northern and Northeastern regions. This represents the reverse of the situation in these two areas in 1973-1974. In the remaining parts

Table 2. Estimated demand for silvicultural labor for regeneration activity, 1973-1974 and 1982-1983^a

Administrative Regions of the Ontario Ministry of Natural Resources												
	Year	North-western	North Central	Northern	North-eastern	Algonquin	Eastern	Central	South-western	Total Ontario	% of total	% change
(Man-days)												
Planting: bare-root.....	1973-1974	10,417	20,775	27,475	9,953	6,784	7,500	4,998	3,395	91,296	80.0	36.3
	1982-1983	6,875	31,563	33,371	12,676	11,938	15,500	6,019	6,459	124,400	66.2	
container.....	1973-1974	25	804	2,332	791	—	—	—	—	3,952	3.5	327.0
	1982-1983	1,933	4,908	7,500	2,531	—	—	—	—	16,872	9.0	
Seeding.....	1973-1974	—	—	—	—	—	—	—	—	—	—	—
	1982-1983	—	—	—	—	—	—	—	—	—	—	—
Modified harvest cut.....	1973-1974	—	174	19	254	1,947	93	3	—	2,490	2.2	593.5
	1982-1983	1,033	9,750	2,183	648	2,894	751	—	—	17,269	9.2	
Scarification.....	1973-1974	566	4,485	5	115	7	—	6	—	5,184	4.5	-9.1
	1982-1983	1,827	1,213	1,026	461	128	63	3	—	4,720	2.5	
Site preparation for planting and seeding..	1973-1974	1,498	3,422	4,415	1,281	110	290	121	9	11,146	9.8	120.2
	1982-1983	4,927	7,971	6,980	2,354	869	1,054	242	144	24,541	13.1	
Total.....	1973-1974	12,506	29,660	34,246	12,394	8,848	7,883	5,128	3,404	114,068	100.0	64.6
	1982-1983	16,595	55,405	51,060	18,670	15,829	17,388	6,264	6,603	187,802	100.0	
% of total.....	1973-1974	11.0	26.0	30.0	10.9	7.7	6.9	4.5	3.0	100.0		
	1982-1983	8.8	29.5	27.2	9.9	8.4	9.3	3.3	3.5	100.0		
% of change.....		32.7	86.8	49.1	50.6	78.9	120.5	22.2	94.0	64.6		

^aProduction-related workers only.

Table 3. Estimated man-day requirements for planting with scarification under four sets of conditions, 1982-1983.

	('000 man-days)					
	1973-1974	Option 1 1982-1983	Option 2 1982-1983			
	Hand planting	Hand planting	Hand planting	Machine planting	Total	
Bare-root.....	91.3	124.4	93.3	12.4	105.7	
Container.....	4.0	16.8	12.6	2.5	15.1	
Scarification.....	9.1	15.0	11.2	—	11.2	
Total.....	104.4	156.2	117.1	14.9	132.0	
	Option 3 1982-1983			Option 4 1982-1983		
	Hand planting	Machine planting	Total	Hand planting	Machine planting	Total
Bare-root.....	74.6	19.9	94.5	74.6	3.3	77.9
Container.....	10.1	4.0	14.1	10.1	.7	10.8
Scarification.....	9.0	—	9.0	9.0	—	9.0
Total.....	93.7	23.9	117.6	93.7	4.0	97.7

Assumptions*

1. 1973-1974 production is hand planted.
2. Option 1 involves 100% hand planting in 1982-1983.
3. Option 2 involves 25% machine planting and 75% hand planting.
4. Option 3 involves 40% machine planting and 60% hand planting.
5. Option 4 involves 60% hand planting and 40% machine planting with a fully automated planting machine.
6. Man-day productivity for scarification is at a rate of .125 man-days/acre (.309 man-days/ha).
7. Hand planting production averages 1,200 trees per day with containers and 800 trees per day with bare-root stock.
8. Average stocking is 1,000 trees per acre (2,500 trees/ha).
9. Machine production is 6,000 trees per day for a manual machine and 12,000 trees per day for a fully automated machine.
10. Planting machines are one-pass planters requiring no advance scarification.
11. Fully automated planting machines require only one man while manual machines require three, or productivity rates of .08 and .5 man-days per acre (.20 and 1.27 man-days/ha).

*The labor and machine productivity parameters are based upon the personal work experience of the authors and of Mr. D. A. Cameron, member of the Mechanization of Silviculture Project, Great Lakes Forest Research Centre.

of the province labor requirements will be greatest in the Eastern region followed by the Algonquin, Southwestern and Central regions, respectively.

The projected demand for labor for planting may be reduced somewhat if planting machines are developed which can operate efficiently and effectively in the boreal forest. Table 3 provides preliminary estimates of man-day demand for various combinations of machine and hand planting for 1982-1983. Option 2, in which 25% of the planting would be done by machine, is probably the most realistic of the four presented. This combination would effectively reduce the labor requirements for planting by about 16% and overall demand by about 14%.

Generally, workers employed for silvicultural work require little training. The major requirements are a strong back and a willingness to work outside. This situation is not expected to change drastically, particularly when hand planting is the primary function of the laborer. However, some of the increase in demand will be for semi-skilled and skilled machine operators for scarification work and perhaps for planting. Thus there will be an increase in both the quantity and the quality of labor demanded.

Supply

In discussing labor supply one would like to begin by describing the silvicultural worker in

terms of numbers employed, education levels, ethnic origin, marital status, age distribution, etc. Unfortunately, this information is not available since there is no recognized market for this type of labor. One is therefore limited to discussing various factors likely to affect the supply in lieu of presenting a statistical exposé of the number of workers available, for example, at different wage rates.

Before discussing factors affecting supply, a review of the qualifications workers must have to be considered part of the labor force engaged in regeneration activity is of interest. First and foremost, they must be available for seasonal work, i.e., from early spring to late fall or parts thereof, but excluding the winter months. The peak demand period usually runs from mid-May through mid-August. Second, they must be capable of doing continuous physical labor. Third, they must be willing to work out of doors. Finally, they must be willing to accept the isolated nature of the job and, occasionally, prolonged periods away from home. These can be considered minimum requirements of the job.

Apart from the personal requirements, the population base and social attitudes towards different types and conditions of employment seem to be the most important factors affecting supply. The population base is probably the most important factor. During the past 10 or 15 years Ontario has experienced a period of rapid increase in the labor force. It has grown from 1.9 million

in 1953 to 3.2 million in 1971 and is expected to increase to 4.9 million by 1986 (Anon. 1976d). The forecasts suggest that the labor force will continue to grow faster than the population, but the rate of increase will slow down considerably, especially after 1986. During the next 30 years, the labor force in Ontario is expected to increase at an annual rate of 2.2%, almost 50% higher than the 1.4% growth in population. However, between 1986 and 2001, the labor force will increase at about half of the 1961-1971 rate (1.6% versus 3.1% per annum).

From a provincial point of view it does not appear that Ontario will be faced with labor shortages in the immediate future. But this is an aggregate summary. What about that part of Ontario in which major reforestation programs are likely to be undertaken, namely, northern Ontario?

Population data and forecasts for Ontario's Northwestern and Northeastern planning regions, collectively referred to as northern Ontario, reveal accelerated growth in the Northeastern Region while in the Northwestern Region population will continue to grow, but at a much slower pace. The projections show, however, that the Northwestern Region can expect negative growth to begin about 1996. Within the Northwestern Region the districts of Rainy River and Kenora are currently showing signs of a marginal decrease in their respective population bases and this is expected to continue throughout the projection period (Anon. 1973). Population data for northern Ontario by major age group indicate that by 1986 approximately 34% of the population will be between the ages of 5 and 24, 31% between 25 and 44 and 17% between 45 and 64 (Anon. 1976c).

Within a given population, the potential labor supply is determined by the number of persons able, willing and available to engage in seasonal work. The persons most likely to qualify will be the unemployed and those not normally counted as labor force participants, e.g., housewives and students. A review of the 1975 unemployment statistics for Ontario suggests that the 15-24 age class group offers the greatest source of silvicultural workers.² However, the other data indicate that the proportion of the population in the 15-24 age group in northern Ontario is expected to fall from about 42% in 1971 to about 34% in 1986 (Anon. 1976c). This may indicate that this group will not provide for a significant increase in the labor supply.

Recently there has been a trend in OMNR to employ women as tree planters, particularly in areas where they can commute daily to planting jobs from nearby communities. Many of the women are housewives who are available only for short periods in the year. While this source will probably continue to provide a steady supply of labor, it is limited to areas within commuting distance of local communities. It will probably not serve to relieve supply shortages in areas of the province in which the work is carried out beyond

reasonable commuting distances.

The second category of works not normally counted in the work force consists of students. They are available for much, if not all, of the planting season and probably offer the greatest potential for future increases in supply. However, since the greatest demand will occur in northern Ontario, and the greatest population of students is found in southern Ontario, there may be problems in recruiting adequate numbers of students in local areas. This suggests that labor will probably have to be imported to the more remote job sites.

The second important factor affecting supply concerns the social attitudes of individuals toward different types of work and the effect of social programs which ease the financial burdens of unemployment and thus encourage the unemployed to be more selective in their choice of employment. This factor is particularly important with respect to the labor supply tied to the forest, mining, and agricultural industries, all of which depend to some extent upon seasonal labor and/or are located in the remote areas of the province where social amenities are few. Consequently, these industries find it extremely difficult to attract workers to jobs that are highly seasonal, are located in remote areas, lack the basic social amenities, or are not generally considered to offer the best working conditions (Anon. 1976a, b).

Social programs such as welfare payments and unemployment insurance offer some alternative to the unemployed, although the decision to accept or reject a given job is generally based on factors such as those listed in the previous paragraph. Generally, however, Canadians are strongly motivated to work and usually hold jobs not because they have to, but because they like to. At the same time the vast majority of Canadians would prefer work to unemployment insurance (Anon. 1976d).

In summary, the labor supply for silvicultural activity is restricted to those individuals who are available for seasonal employment, capable of doing physical labor, and willing to work under the varied physical conditions found in forested and harvested areas. The number of people falling into this category depends upon the population base, and the prevailing social attitudes toward work, especially work under less than optimum conditions.

Future Supply

It was pointed out earlier that present demand for silvicultural labor is centered mainly in northern Ontario and that most of the forecast increases in demand for this type of labor will occur in the same area. It was also suggested that many of the silvicultural operations are likely to be carried out in areas which can be described as somewhat remote from established communities.

To date, the major sources of labor for silvi-

²Labor Force Survey Section, Statistics Canada, 1976 (Personal communication).

cultural work have been the communities close to OMNR operations, or Indians brought down from the northernmost parts of the province. Generally the work force has been comprised of unemployed males, women and students, with the women and students in most cases being available for seasonal work only. The question is whether or not these sources of labor will be sufficient to meet the increased demand for silvicultural work in the future.

Demographic studies and population projections for northern Ontario indicate that growth will be slow in most communities, with major increases occurring in the large urban centres such as Thunder Bay and Sudbury (Anon. 1976c). Already several areas in northwestern Ontario are experiencing population reductions. The implication of these data is that serious labor shortages may result in the more remote communities. Such shortages will in turn generate stiff competition for labor between resource-oriented industries such as forestry and mining. The obvious effect of this is that the pool of workers available for silvicultural work may be noticeably reduced.

People are less anxious today than ever before to work in forestry jobs — logging, silviculture, or otherwise (Anon. 1976a, b). As harvesting operations move further north, the situation will only be aggravated. It will be much more difficult, for example, to attract workers to areas north of Nakina or Savant Lake than to areas in close proximity to Thunder Bay. It will be more difficult to persuade workers to live in forest camps than to commute. Such effects have already been experienced by the forest industry in general (Day 1973) and will soon be felt by the silviculture industry in particular.

In summary, labor supplies from traditional sources will probably be insufficient to meet forecast demand. In addition, there will be a distinct variation in supply between areas accessible and reasonably close to large urban centres and the more remote locations. Finally, the major labor supply problems will occur in northern Ontario where the bulk of Ontario's regeneration program will take place.

Some implications of the labor supply/demand situation for forest management in Ontario are:

1. Labor-intensive silviculture may have to be restricted to areas near urban centres.
2. Recruitment programs aimed at persons not generally considered part of the permanent

work force such as some housewives, students and native people, but possibly available for seasonal employment in silviculture, should be expanded.

3. Employment opportunities in silviculture will have to be made more attractive by increasing the employment period.
4. Wages will have to be competitive with those for industrial activities.
5. Mechanization of silviculture and especially planting of both bare-root and container stock should be promoted. This may be particularly critical for the more remote work locations.
6. There will be a need for a more selective approach to forest management, with the more productive sites receiving the most intensive culture, in order to ration the available labor supply among the best investment opportunities.
7. There may be increasing pressure on the forest industries to divert some of their labor to silvicultural work. This may further aggravate their labor supply problems.

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