SPRUCE MANAGEMENT FOR THE FUTURE

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INTRODUCTION

What to grow for the markets of tomorrow? Forest management is a broad subject—so broad in fact that it encompasses the whole curriculum of forestry, but this question pins down this topic to manageable size.

GENERAL

When the subject is confined to a particular genus and where climate and terrain play such an important part, then one must be specific in the area to which he refers in order not to be misunderstood. The remarks which follow will refer to that portion of Northern Ontario lying north of the *hump* on Lake Superior for 150 miles and from 60 miles to 140 miles east of Lake Nipigon. Overall relief varies from 602 feet at Lake Superior to 1,400 feet on the height-of-land 35 miles north to 600 feet in the northeast portion. The whole area lies within the Laurentian Shield and the terrain varies from rough hilly country where the soils generally are thin and rocky, to rolling flat country with silty mixed-wood sites, sand plains and deep swamps. Annual rainfall in this area is 27 inches compared, for example, with 50 inches on the east coast, and 100 inches on the west side of Vancouver Island.

The swamp areas, occupied by black spruce in general regenerate satisfactorily after cutting. The sand plains which support jackpine, mixed with black and white spruce where the water table is fairly high or the silt or clay fraction of the soil is higher, are presently managed by clear cutting. Much layering of black spruce occurs, but considerable planting of both jackpine and spruce is required.

The better mixed wood sites are the chief problem. These support stands of white and black spruce, balsam, poplars and white birch in varying combinations according to soil differences.

PAST CUTTING METHODS

Until very recently, the lack of all-weather roads in the area made the only economic system of harvesting, clear-cutting. On the good mixed-wood sites this has generally resulted in a lush growth of hardwoods, shrubs such as hazel, mountain maple, raspberry bushes, and some balsam.

With the construction of good all-weather roads by Kimberly-Clark in the past twelve years, strip cutting of 4 ft. and 8 ft. wood with winter sleigh-haul has given way to horse-skidding of 16 ft. wood (83 percent), tractor skidding of tree-lengths (17 percent), and bucking to 16 ft. wood, and truck hauling.

Camps have progressed from log shanties to tarpaper-covered rough lumber, to modern, attractively painted, insulated dormitories with rooms for each two men, to commuter operations where the men live in town in their own homes and drive to their work areas each day. These new conditions of good roads and commuter operations have an important significance in the management of our forests.

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WHY SPRUCE

Since many people ask "Why worry about spruce regeneration when balsam may be had without difficulty?" four points may be used here to explain why balsam is considered unacceptable.

First—in natural stands in the Maritimes and Newfoundland balsam accounts for 65 percent or more of the cut. In Quebec the proportion of balsam is still high, possibly 40 percent. In the Longlac area where fire has been kept out for long periods, balsam forms about eight percent of the natural conifer stand. The distribution of sites has something to do with this, but climate, disease, insects and similar factors play an important part too. There is no reason to believe, from the observance of nature, that management for balsam in our area would be a safe practice—even if we wanted it, which we don't.

Second—wage rates in the Longlac area are comparatively high. The average piece worker in 1958 made \$23.61 per day (produced 3.04 cords). A cord of balsam costs as much to produce and deliver to the mill as a cord of spruce but balsam is less dense. Balsam has an average density of .33 compared to .35 for white spruce and .40 for black spruce. This means that white spruce yields over six percent more fibre and black spruce over 21 percent more fibre than balsam. Although balsam stumpage is less than spruce, a cord of spruce at the mill, based on wood fibre produced, is still worth more than balsam by \$4.00 or \$5.00.

Third—where all wood is delivered to the mill by water as in our case, sinkage can be an important factor. Actual tests have shown that we lose seven percent of balsam the first year and if any is held to the second year the loss is 13 percent, compared with one and a half percent or less for spruce.

Fourth—balsam is more susceptible to disease, insects, and windthrow. Balsam is very susceptible to red rot, brown cubical rot, and feather rot, and when conditions are right the spruce budworm can destroy large areas of balsam in a short time.

Finally, both white and black spruce are quality woods for pulp production and for the sawmill. Both grow well in our area, once established.

SPRUCE REGENERATION

For many years—since 1928 at Kapuskasing and since 1945 at Longlac, Kimberly-Clark has tried many cutting methods, and stand treatments in an attempt to secure satisfactory stocking to the desired species after cutting and these efforts are continuing. Long ago they made the decision that if they were to have satisfactory stands in the second rotation, planting would be necessary.

Mr. Bonner has explained how in the year 1947 a seedling nursery was established by the Spruce Falls Power and Paper Company Limited at Kapuskasing. In 1951 a transplant nursery was established at Longlac. Cones are collected from selected stands in good seed years at Longlac, the seed extracted at the Government seed extracting plant, and sent to Kapuskasing where the seedlings are raised. These in turn are brought to Longlac as 2-0 and grown to 2-2 seedlings in the transplant nursery.

In 1959 on our Longlac Operations we planted 1,200,000 transplants—white and black spruce, jackpine and a little red pine. In other years some Norway spruce was planted, too. The target for succeeding years is 1.5 million field planted. To date over 7.5 million trees have been planted out.

This planting is done by the regular cutting crews. This accomplishes several things: (a) It helps to keep the labour force constant. (b) It provides the very best of workmen. (c) Since cutters are with us year after year, instruction in planting is not lost to the operation. (d) Most important of all it impresses on the men the value of a tree and makes the task of saving the advance growth easier. (e) This conservation of the advance growth is important since our planting program is one of supplementing the natural regeneration.

Planting costs money. Any forest treatment to bring about regeneration costs money. The system that will cost a company the most money in the long run is that of doing nothing. Those companies that care well for their areas will profit in the second rotation.

THE FUTURE

Much of the effort to date has been devoted to the pioneering aspects of management, the establishment of a good road system and the development of suitable logging practices. As this phase matures, more money and effort will be available for improvement of tree strains and obtaining optimum stocking.

When our forefathers were clearing the forests to make farms, and planting their grain among the stumps and rocks they didn't have too much time to devote to heavier yields per acre, hybrid corn, rust-free wheat, and so on; these things came in time.

The next quarter century because of good roads and commuter operations will see: (1) Success in the development of some stand treatments that may lessen our dependence on planting. (2) Periodic cuts at possibly 20-year intervals which will result in salvaging potential mortality and thus realize a higher yield per acre. (3) Group cuttings where there are all-aged stands or patches of mature timber are intermingled with immature stands. (4) Salvaging stands that are windthrown or attacked by insects or disease. These three hazards will be much reduced in the second rotation however, since the forest will be much closer to a normal forest than the one at present which is 49 percent mature and overmature. (5) Geneticists producing superior, faster-growing strains with dense wood, long fibre, good form, resistant to disease and insects and these superior strains will be introduced into the forest. (6) Fertilization undoubtedly will play an important role as detailed knowledge of our soils and tree requirements improves. (7) Fire will quite likely be a common silvicultural tool if only to break down the slash, and in some places, heavy organic layer, to facilitate planting. It will also reduce the breeding material for insects and fungi, and will improve forest sanitation and operating conditions. (8) Chemical release of the softwoods will be a common procedure. (9) Seed will all be secured from orchards where the lineage has been proven to produce superior progeny.

Gentlemen, my look into the future is a very prosaic and not a very daring one. All of the practices mentioned have already been carried out at least experimentally on our area or are planned for the immediate future.