MARKING BY SVEND O. HEIBERG

Professor of Silviculture
State University of New York, College of Forestry
Syracuse, New York

It was difficult to mark this stand because I believe that there is much local ecological and economic information that any marker needs before he can do a good job. I received considerable assistance, both mechanical and otherwise, from Dr. Farnsworth, but I do not want to make him responsible for the marking. Two objectives were suggested, but I marked the plot for only one objective because the other one, I believe would be rather simple.

If we want to have maximum pulpwood production here, I believe that a clear cutting would be the way to do it. Cutting to a flexible diameter limit of 11 to 12 inches or something like that; cutting down below that on the poorer trees and leaving only the very best trees a few inches above that limit. I believe that this stand at age 60 years has passed its maximum production. In older ages the production will go somewhat downward. It is possible, or probable, that the maximum fiber production is around 50 years. I may be wrong but I don't think it will vary much from that. Furthermore, while this stand looks fairly good, if you examine it closer, there are relatively few good trees. That would, of course, be a low investment and it would also be alow quality product that we would be getting in that way. But it may be that we would get a better stand if we opened it up that much and started with a stand from which we could get the highest financial return.

The marking I have given to you meets the second objective; trying to work for the best that we have here, and run that up to a mean diameter of the larger trees around 22 inches or so, several trees running well up into the 30's or upper 20's, and with perhaps an age of 80, 90 or 100 years. The objective here then was not necessarily to remove the poor trees, but to work for the best that was in this stand. I started out hoping to work for the cherry and hard maple and to diminish the beech and soft maple. However, going through it, it is very clear that the cherries are in poor condition. In other words, I removed much more of the cherry than I would like to have done, but I felt that I had to do it. Most of the cherries appear to me rather defective.

The best trees in here, as Mr. Bennett has said, are actually the soft maples, and it was natural to keep them and even favor them in many cases. I have diminished the beech as much as possible and have removed about 33 percent of the basal area, which is approximately the same in cubic foot volume, that means taking better than 10 cords and leaving about 20 cords. Out of the basal area above 6 inches, I have taken 40 percent, so actually we have taken about 12 cords on an acre basis, leaving a basal area of about 80 square feet assuming that we can here get full production on such a low basal area. It is possible that we can reduce the basal area of the stand to half of that and still get the same fiber production.

In number of stems 62 percent of the cherry was marked; in basal area 68 percent. As I have said it was really against my intention to do it, but I felt that we had to do it. In hard maple 21 percent of the stems (15 percent of the basal area) was taken. In soft maple 21 percent of the number of stems, 27 percent of the basal area. In beech 51 percent of the number of stems and 1 percent of the basal area. Yellow birch, 12 percent and 12 percent. I believe that is all the time I should take right now. Are there any questions?

Discussion

Ehrhart Would you explain a little closer what you meant by saying that if you were to handle this primarily for pulpwood yield you would clear-cut at this time?

Heiberg A stand had the greatest potentiality to produce fiber in youth. As a stand is getting older, for any species, the production of fiber is lower. Roughly speaking at 90 to 100 years the production in cubic feet is about half the production at about 30-40 years, but that varies somewhat with species. With a more tolerant species the ages will go up, with the intolerant species, such as the southern pines, it will be relatively low. The maximum production there would probably be around 20 to 25 years. In a stand such as this, as I have stated, the maximum production will be around 40 to 14.5 years so that I would assume that the rotation here for the highest volume production would be around 50 years. Furthermore, the highest production will be obtained from the tolerant species rather than the intolerant species. I am talking about fiber, I am not talking about quality right now.

Ehrhart In response to that I might say that our studies indicate the greatest volume growth seems to be in the period between 35 and 45 years. But those studies are based on stands not under active management. Once intermediate removals of merchantable material are made the picture changes by reduced mortality in the remaining stand, Our whole pattern of operation is based on the practice of thinning from the top, which gives a relatively high volume from few stems and which keeps a large number of smaller stems alive and growing. Thus the initial cut, after giving a substantial yield, leaves the stand with such number and size of stems, and with such growing space available to them, that the growth rate of usable material remains similar to that during the decade of apparent highest increment. In other words we feel that thinnings from the top, when begun early in the life of an even-aged stand, re-creates the conditions favorable to obtaining highest increment usable for pulpwood on a repeated cutting-cycle basis.

Heiberg Is your argument that these small trees have the ability to act like a young tree?

Ehrhart So far we have had that indication, yes. In other words, none of this timber has seemed too old to respond to release. Even some of these beech trees that were left-overs from the old growth have shown a remarkable growth rate since their release, even though they were 100 years old when left.

Heiberg But do they still have the ability to act like a 20-year tree?

Ehrhart We feel that collectively the large number of small stems left gives us the accumulated volume increment, even though the response to release may vary with the individual.

Farnsworth Are you thinking in terms of maintaining a fairly even-aged stand or shifting to an uneven- or several-aged stand by your cutting procedure?

Ehrhart I would say in response to that, that the objective we are seeking is to maintain the periodic growth on one level and our crop trees on another level. What would develop would be a 2-story forest with the crop trees remaining for the final cut, and in the meantime smaller trees coming in successively to each periodic cut as a type of tree which is desirable for pulpwood.

Farnsworth Would you then try to produce an even-aged stand at the end of the rotation or would you continue with the 2-story forest?

Ehrhart No, we would use the crop trees for seed source and also as a source of yield to bridge the gap between the new reproduction and that period of time when the new reproduction would become merchantable. As it stands today, we have to wait until a second-growth stand is 35 to 40 years of age before we can start to cut into it. So, throughout that whole period we have lost through mortality a lot of the growth that has been given to us. Our objective is to eliminate as much of the squeeze loss as possible. Our crop trees may partially serve that purpose by providing intermittent yield before the new stand reaches pulpwood size.

Bennett One of the objections to the type of pulpwood management that Svend mentioned is this. If you clear-cut continually as a one-cut proposition, say every 50 years, you would lose the value of all road improvements. We would have to come back continually rebuilding new roads and feeder roads.

Heiberg I do not suggest that you should continue on a 50-year basis. I think the best forestry here would be on a long rotation. The greatest money that you would produce, and you would have a considerable pulpwood production, would be on the high rotation. My only suggestion is this, that I am not sure that in this particular stand that we have here, that I am finding enough to build upon. In other words, in the detailed marking I was disappointed in the trees that I had to favor, making a heavier cut than I actually wanted to do, but I felt that that would be the greatest interest to do that way. Therefore, I say that I am not sure that the best thing would not be to clear-cut and then to start over again in this stand, and then to continue on a longer rotation. Although the production might be reduced a little, the quality production would be that much greater.

Bennett Apparently you don't agree with the quality ratings we had on the sheet. If you make an analyses of them, the quality ratings would be something like this: 46 percent of the trees would be very good, 19 percent good, 14 percent fair, 5 percent poor and about 17 percent very poor.

Heiberg Well, if I had had better black cherries in here, I would have been happier. What concerns me so much are the spot injuries to almost every black cherry in here. I had to cut better than 60 percent of the cherries in spite of what I would like to have done.