Hardwood Marking Demonstration on the Argonne Experimental Forest

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In a second-growth northern hardwood stand on the Argonne Experimental Forest a half-acre plot was laid out and all trees on it were numbered and measured. The principal species were sugar maple, basswood, and yellow birch. Stand basal area was 134 square feet and gross volume some 10 M board feet per acre (table 1).

Prior to the conference the half-acre plot was marked for cutting by a geneticist, a research forester, an industrial forester, and a National Forest officer. Marking was done by placing a colored tag (a different color for each marker) on each tree to be cut. The tags were removed immediately after marking so that none of the markers knew what his colleagues had done.

The objectives of the different markers were as follows:

1. Geneticist -- Remove all trees with undesirable characteristics that probably are heritable (such as poor form, thick limbs, broad crowns, poor branch angle, susceptibility to injury).

2. Industrial Forester -- The objective in marking this plot was two-fold: (1) To develop group selection management, and (2) to remove the inferior quality trees in a commercial type operation.

   Basal area was not used as a marking guide. Instead, all trees were classed in one of the following groups, and those of class 3 were removed: (1) Trees adapted to the site and which will produce two clear logs of high-value products at the end of the rotation, (2) trees of intermediate quality and whose retention in the stand is dependent upon quality, stocking needs, species composition, and suitability to soil type, and (3) trees of inferior quality which would add only increased quantity of low-value products throughout the rotation age of the stand.

3. The Research Forester and the Timber Management Assistant each used his own judgment in applying the recommendations given in Lake States Forest Experiment Station Paper 56, "Marking Guides for Northern Hardwoods." Essentially this provides for reducing

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1/ Respectively, Research Forester, Lake States Forest Experiment Station, Three Lakes, Wis.; Research Forester, Lake States Forest Experiment Station, Rhinelander, Wis.; Forester, Consolidated Water Power and Paper Co., Rhinelander, Wis.; and Timber Management Assistant, Nicolet National Forest, Rhinelander, Wis.

Table 1.--Summary table: Hardwood marking demonstration plot, Argonne Experimental Forest

Size class (inches)	Sugar maple	Bass-wood	Yellow birch	Other hardwoods	Total
		NUMBER OF TREES PER ACRE			
5- 9	54	6	6	8	74
10-14	34	36	2	2	74
15-19	8	18	2	2	30
20+	2	--	2	--	4
Total	98	60	12	12	182
		BASAL AREA PER ACRE			
5- 9	16.80	2.46	1.68	1.80	22.74
10-14	23.34	30.62	1.56	1.32	56.84
15-19	13.48	24.60	3.16	2.46	43.70
20+	5.76	--	5.28	--	11.04
Total	59.38	57.68	11.68	5.58	134.32
		GROSS VOLUME,[1] BD. FT. PER ACRE			
--	3,664	5,448	832	302	[2] 10,246
		TOTAL VOLUME,[3] CORDS PER ACRE			
--	19.82	20.40	4.40	1.74	46.36

1/ Gross volume, Scribner Rule, above a 1-foot stump to an 8-inch inside bark top diameter or where merchantability is limited by branches, defect, or deformity. Table No. 1, U.S.D.A. Tech. Bul. 1104, Composite Volume Tables for Timber and Their Application in the Lake States, 1954.

2/ Estimated cull (sample of 18 trees), 24.3 percent.

3/ Volume of stems and branches to a 4-inch top in rough cords, including sawlog trees. Local volume table no. 2, Argonne Experimental Forest.

the stocking to about 70 square feet of basal area in trees of sawtimber size (10 inches and up in d.b.h.) by removing the trees of poorest quality and potential.

At the time of the field stop the colored markers were placed on the designated trees and the foresters who had done the marking were on hand to explain why they had marked as they did. Since timber marking is an art rather than a science, and thereby subject to considerable individual interpretation, there were differences in the marking, particularly on an individual-tree basis. Despite these differences there seemed to be surprisingly good agreement between the three jobs in the basal area of the residual stand (table 2). From a technical standpoint, what was shown here was that, regardless of objectives or personal experience, northern hardwood management in the Lake States is fairly. uniform.

Table 2.--Marking summary of hardwood demonstration plot,

Argonne Experimental Forest

Marked by --	Basal area	Volume of sawlog trees		Total volume
		Gross	Net	
	Sq. ft.	Bd. ft.	Bd. ft.	Cords
		MARKED PER ACRE		
Industrial forester	68.0	5586	4150	24.1
National Forest officer	66.1	5974	4170	24.3
Research forester	63.8	4956	3336	22.8
Geneticist	60.4	4870	3370	21.8
		RESIDUAL PER ACRE		
Industrial forester	66.3	4660	3638	22.3
National Forest officer	68.2	4272	3867	22.1
Research forester	70.5	5290	4557	23.6
Geneticist	73.9	5376	4642	24.6

Questions from visitors to the demonstration provided interesting discussion on the ground. Much of the discussion was conducted in small groups, with or without the markers. The fact that group selection was advocated as a system of management by the industrial forester rather than the usual individual tree selection brought out considerable discussion and mild disagreement. However the reasons given by the marker for suggesting the use of group selection were: (1) To secure, if possible, better

species composition and avoid a maple monotype which is prevalent throughout much of the area and (2) to avoid the heavy deer browsing that has influenced and retarded the development of good hardwood regeneration in this immediate area. The assumption was that openings would help to "force" the growth of newly established hardwood regeneration, following 4 liberal deer seasons in this area.