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LSU 21

# Lumber Grade Yields from Paper Birch and Balsam Poplar Logs in the Susitna River Valley, Alaska

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## Foreword

Susitna River Valley paper birch stands are of continuing interest to forest managers because they believe them to be a useful and usable timber resource. The forest industry has shown recurring rather than continuing interest. A number of factors are responsible. One remedial factor is the acquisition and dissemination of more specific information for paper birch and associated commercial species. More reliable estimates of the volume and quality in standing trees and the lumber yield, including quality, from these trees were immediate objectives. This report is focused primarily on the latter.

We asked for and received the support of a variety of individuals and organizations. Our appreciation is acknowledged. Because of necessity, we drew from Forest Service units outside of Alaska those men with the special competence required. It was their contribution that made the study successful. Thus, we are especially appreciative to Roswell D. Carpenter, hardwood specialist from the Northeastern Forest Experiment Station, and Hiram Hallock and Arno Wollin, sawmilling and lumber grading specialists from the Forest Products Laboratory.

Richard M. Hurd, Director  
Institute of Northern Forestry

*COVER PHOTO: Some good-quality paper birch logs from the Susitna River Valley, Alaska.*



# Contents

	Page
<b>INTRODUCTION</b> .....	1
<b>PROCEDURE</b> .....	3
Log Preparation .....	3
Sawing .....	3
Lumber Drying and Grading .....	3
Log Grading .....	3
<b>RESULTS</b> .....	4
Paper Birch .....	4
Balsam Poplar .....	5
<b>SUMMARY AND CONCLUSIONS</b> .....	6

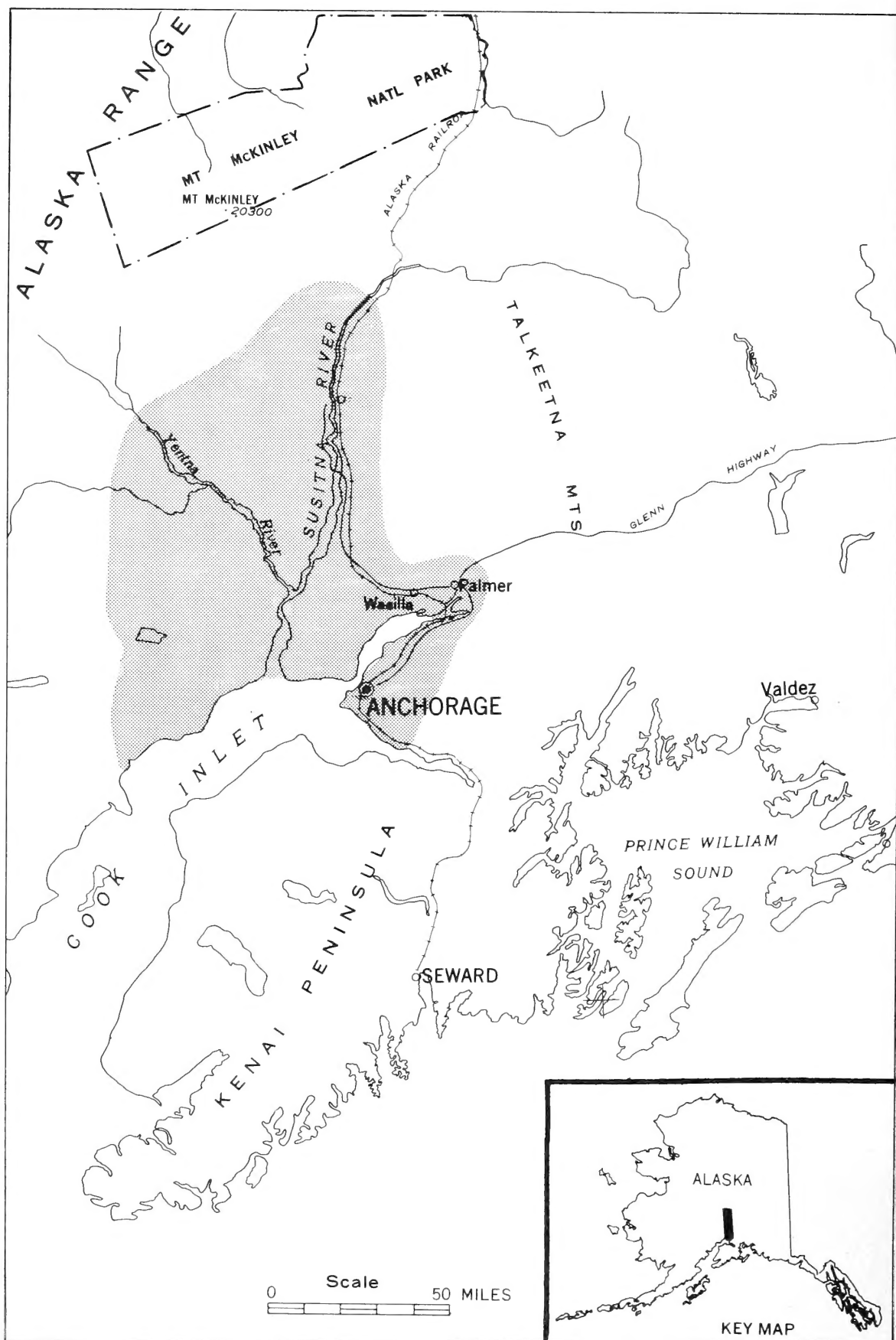


Figure 1.  
The Susitna  
River Valley.

# Introduction



THE SUSITNA River Valley (fig. 1), located at the head of Knik Arm in Cook Inlet, contains a considerable acreage of hardwoods. Paper birch (*Betula papyrifera*) and its varieties are the most common tree species; but balsam poplar (*Populus balsamifera*), quaking aspen (*Populus tremuloides*), and white spruce (*Picea glauca*) also are major stand components in some areas. This valley is a logical site for establishing a hardwood industry since it is traversed by the Alaska Railroad and is close to the port cities of Anchorage and Seward.

The earliest plans to use this hardwood resource were made in 1916 by Robert Dollar, who made an initial survey of the Goose Bay area of the Knik stand for the steamship company that he headed. The plan was to develop cargo for the Orient, but World War I stopped that enterprise.

More recently, both the Knik and Talkeetna birch stands have been under sporadic scrutiny by a succession of entrepreneurs. Many have been impressed by the birch stands, but most have concluded that, because of high operational cost, the time was not ripe for commercial use of the resource.

The Alaska Hardwoods Company has been operating a sawmill in Wasilla since 1960 (fig. 2). Most of the mill's output of paper birch and balsam poplar has been marketed locally, although some lumber has been shipped to California and the Pacific Northwest. If these and other outside markets are to be developed fully, basic operating and economic information must be obtained.

In 1964, through the cooperative efforts of several agencies, a study was conducted with the Alaska Hardwoods Company to determine the lumber grade recovery from paper birch and balsam poplar logs for each of the three U.S. Forest Service log grades.<sup>1</sup>

Pertinent information contained in the Alaska Forest Survey report<sup>2</sup> has been included in this paper. This information, together with the lumber grade yields, should be valuable to anyone interested in the commercial aspects of Alaska's hardwoods.

<sup>1</sup>U.S. Forest Service. *Hardwood log grades for standard lumber*. Forest Prod. Lab. U.S. Forest Serv. Res. Pap. FPL-63 [Rep. D1737], 52 pp. 1966.

<sup>2</sup>U.S. Forest Service. *Preliminary Forest Survey statistics for the Susitna River Valley of Alaska*. Inst. North. Forest., 15 pp. December 1966.

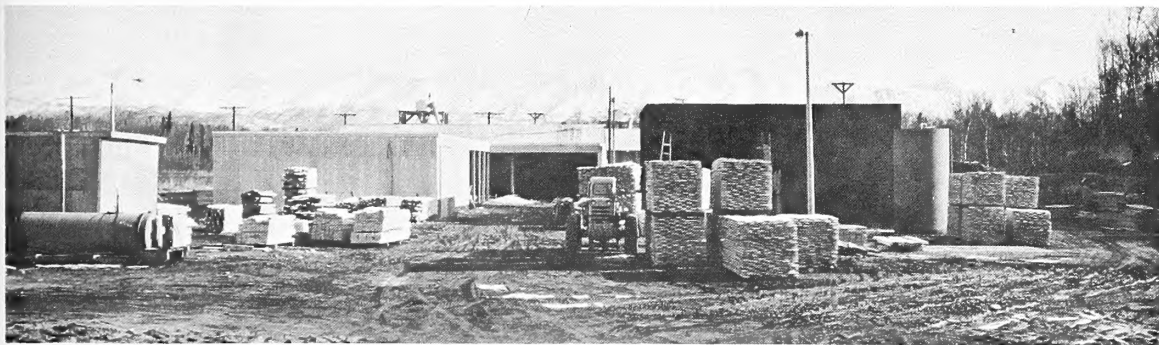
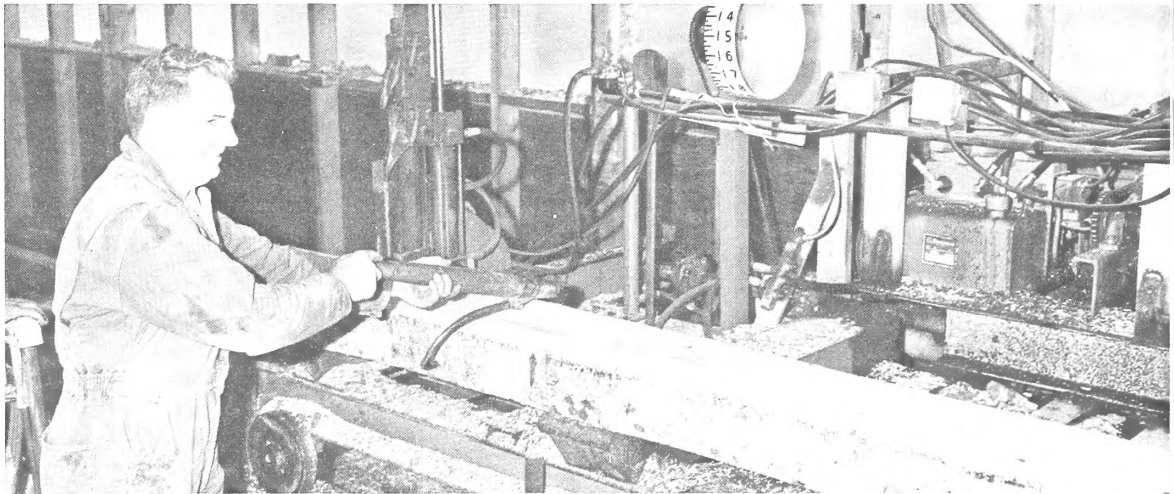


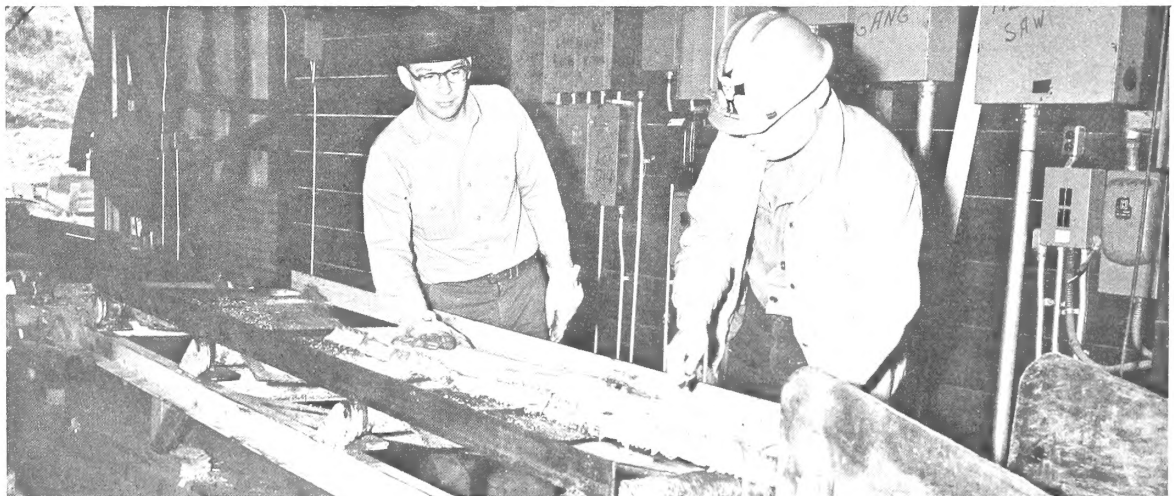
Figure 2.  
The Alaska  
Hardwoods Co.,  
Wasilla, Alaska.



*Figure 3. – Each log was scaled by a hardwood timber-quality specialist. Log diagrams were also verified and corrected to assure uniformity.*



*Figure 4. A sawmill specialist from the Forest Products Laboratory positioned each log on the carriage to assure maximum recovery of high-grade boards.*



*Figure 5. To identify the boards through the kiln-drying and lumber-grading phases of the study, each board was numbered as it left the headsaw.*



# Procedure



## Log Preparation

Logs for the study came from trees on a sale area of Goose Bay, approximately 32 miles from Wasilla. In all, 54 birch and 57 balsam poplar trees were selected. They were chosen so that the full range of tree diameters and butt log grades was represented.

After felling, each tree was bucked to yield logs of the highest grade possible. This resulted in 162 birch and 174 poplar logs that were scaled according to the International 1/4-inch and Scribner Decimal-C log rules (fig. 3).

A diagram of each log was made that showed the location and size of all defect indicators present on the log's surface and ends.

## Sawing

The balsam poplar logs were sawed into 4/4 lumber, the birch into 4/4 and 5/4 lumber, and some of the birch hearts into 14/4 car stakes. A Forest Products Laboratory sawmill specialist directed the sawing (fig. 4). Each board was numbered so that it could be related to the tree and log from which it was sawed (fig. 5).

## Lumber Drying and Grading

All lumber was kiln-dried on a 5-day drying schedule to between 6 and 9 percent moisture content. Then the Forest Products Laboratory grading specialist graded each board according to National Hardwood Lumber Association rules.<sup>3</sup> A board tally was kept that included log number and board grade, thickness, and surface measure.

Bark pocket defect that adversely affected lumber grade was encountered in several of the balsam poplar boards. Bark pockets can be caused by one or more agents, among the more common being sapsuckers and insects. In this case, the defect probably resulted from insect activity. How much timber may be damaged is unknown.

The poplar boards were graded by two systems: (1) by the standard lumber grades, in which bark pockets were considered as defects; and (2) by a second system that ignored the presence of bark pockets. Yields obtained by the latter method should be similar to those where insect damage is not prevalent.

## Log Grading

Each log diagram was graded with the Forest Service Standard Grades. Log and board information were placed on IBM punch cards. Dry lumber grade yields and overrun percentages were summarized by log grade and scaling diameter.

Yields based on green lumber tally are not presented in this report. However, they may be obtained from the Institute of Northern Forestry.

Logs that did not meet the minimum requirements for grade III were examined to determine if they could be placed in either the Construction or Local Use Class. Specifications for these two classes of logs may be found in "A Guide to Hardwood Log Grading."<sup>4</sup>

<sup>3</sup>These rules for measuring and inspecting hardwood and cypress lumber are published biennially by the National Hardwood Lumber Association, Chicago, Ill.

<sup>4</sup>Ostrander, M.D., and others. *A guide to hardwood log grading (revised)*. U.S. Forest Serv., Northeast, Forest Exp. Sta., 50 pp., illus. 1965.



# Results

## Paper Birch

Lumber grade recovery for birch is summarized in tables 1 to 5. Because of the small number of grade I logs, there is little that can be said about these yields. It is possible that, in most stands, grade I logs do not exist, primarily because the trees do not produce logs that are large enough. Likewise, the yields for grade II logs beyond 15 inches are of little significance.

A lumber-thickness distribution accompanies each yield table.

Lumber grade recoveries from this study were compared with those from a study of paper birch in Minnesota (table 6).

More No. 1 Common lumber was taken from all grades of the Alaska logs. The percentage yield of No. 1 Common and Better for log grades II and III was nearly equal for the two locations. For these same log grades, considerably more grade 3B lumber was present in the Alaska logs. This was, in part, because they contained more rot than those in the Minnesota study. However, it was noted that the Alaska logs exhibited less sweep.

Overrun percentages for the International 1/4-inch and Scribner Decimal-C log rules are shown in tables 7 to 12. The headsaw at the Alaska Hardwoods mill had an 11/32-inch kerf, and for 4/4 lumber the total set was 1-1/2 inches. This is 1/8 inch greater than normal for hardwood circular mills. Because of the excessive total set, yields and overruns were less than would normally be expected. The effect that this factor has upon total recovery is shown below:

Lumber thickness (inches)	Expected recovery	
	Standard set (percent)	1/8-inch overset (percent)
4/4	100	91
5/4	100	92
6/4	100	93
7/4	100	94
8/4	100	95
9/4	100	95
14/4	100	96

Results of the recent forest survey indicate that birch sawtimber stands cover 490,700 acres of the 5,366,000-acre Susitna River Valley. About 70 percent of the birch stands contain over 1,500 board feet per acre, according to International 1/4-inch log rule. This valley contains slightly over 1 billion board feet of birch sawtimber, and about three-fourths of this is in trees that are 11 to 15 inches d.b.h.

Net volume of sawtimber in each log grade, expressed as a percentage of total net volume, is shown below:

Grade	Percent of total net volume
Log grade I	1.5
Log grade II	13.6
Log grade III	76.7
Other	8.2

The low volume in grade I logs is related to the high proportion of small trees.

### Balsam Poplar

Recovery results for poplar based on the standard lumber grades are summarized in tables 13 to 17, and recoveries on a "bark pockets no defect" basis are shown in tables 18 to 22. We suggest that the second set of tables be used when yields are predicted for balsam poplar logs that come from areas where bark pockets do not occur.

In table 23 lumber grade yields for balsam poplar are compared with those for cottonwood. It is evident that the Alaska logs did not produce the amount of high grade lumber found in eastern cottonwood.

Tables 24 to 29 contain overruns by log grade and scaling diameter.

Results of the forest survey show that nearly 1.3 billion board feet of balsam poplar sawtimber grow in the Susitna River Valley. Seventy percent of the 120,400 acres, classed as balsam poplar, has a volume greater than 5,000 board feet. The log grade distribution that follows is more favorable than that for birch.

Grade	Percent of total net volume
Log grade I	13.8
Log grade II	25.0
Log grade III	56.7
Other	4.5



## Summary and Conclusions

Lumber grade yields and overruns by log grade and scaling diameter were determined for 162 paper birch and 174 balsam poplar logs from Alaska. The information obtained will be useful for timber appraisal and, when coupled with the saw-log volume and quality information contained in the preliminary Susitna Valley Forest Survey report,<sup>5</sup> could have implications for industrial development.

This study has shown that U.S. Forest Service standard grades for hardwood logs are adaptable to birch and balsam poplar in Alaska. However, additional recovery information is required for grade I birch logs. Grading rules of the National Hardwood Lumber Association also proved to be well suited for use with these species.

Those who desire to pursue further the economic aspects of a hardwood industry in Alaska are directed to a recent report from the University of Alaska's Institute of Social, Economic, and Government Research.<sup>6</sup>

<sup>5</sup>See footnote 2.

<sup>6</sup>Massie, Michael R. C. *Marketing hardwoods from Alaska's Susitna Valley*, Univ. Alaska Inst. Soc. Econ. Govern. Res. SEG Rep. 9, 1966.





## PAPER BIRCH IN ALASKA

Table 2. – Log grade II

Dry lumber grade yields, by scaling diameter, based on NHLA rules									
Scaling diameter	Logs	Total dry tally	Lumber grade						
			Fas	Sel	1C	2C	3A	3B	Stakes
Inches	No.	Board feet	Percent of total dry tally						
10	4	154	3.9	8.4	22.7	17.5	3.3	20.8	23.4
11	12	627	.8	19.0	21.5	12.8	6.8	30.5	8.6
12	21	1,137	.0	12.0	36.9	17.8	2.3	21.5	9.5
13	6	427	5.6	15.2	29.8	23.2	.0	17.8	8.4
14	8	603	18.4	10.4	32.5	19.1	2.0	17.6	.0
15	2	133	18.0	23.4	20.3	19.5	3.8	15.0	.0
16	1	70	.0	.0	24.3	31.4	15.7	28.6	.0
17	1	41	.0	.0	39.0	39.0	.0	22.0	.0
All diameters	55	3,192	Total tally, board feet						
			170	428	973	587	102	698	234
			Percentage distribution						
			5.3	13.4	30.5	18.4	3.2	21.9	7.3

Distribution of above yields by thickness							
Lumber thickness	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	Stakes
Inches	Percent within grade						
3/4	0.0	1.4	1.5	1.7	5.9	0.6	0.0
4/4	17.1	27.6	34.9	47.0	43.1	42.2	.0
5/4	82.9	69.6	62.2	47.9	25.5	16.8	.0
6/4	.0	1.4	.0	.0	.0	.0	.0
7/4	.0	.0	.0	1.7	.0	.0	.0
8/4	.0	.0	1.4	1.7	25.5	37.2	.0
9/4	.0	.0	.0	.0	.0	3.2	.0
14/4	.0	.0	.0	.0	.0	.0	100.0
	Total tally, board feet						
	170	428	973	587	102	698	234



Table 3. — Log grade III

Dry lumber grade yields, by scaling diameter, based on NHLA rules

Scaling diameter	Logs	Total dry tally	Lumber grade						
			Fas	Sel	1C	2C	3A	3B	Stakes
Inches	No.	Board feet	Percent of total dry tally						
8	14	280	0.0	1.1	6.8	20.0	4.6	48.2	19.3
9	26	680	.0	4.3	14.8	19.3	6.3	34.1	21.2
10	22	634	.6	8.4	17.3	29.0	3.0	30.3	11.4
11	13	406	.0	2.2	21.9	27.1	2.7	38.2	7.9
12	2	60	.0	18.3	25.0	10.0	16.7	30.0	.0
13	6	356	.0	.8	33.7	31.5	2.8	31.2	.0
14	6	341	.0	4.7	25.5	34.6	.9	34.3	.0
15	2	105	.0	.0	18.1	47.6	8.6	25.7	.0
All diameters	91	2,862	Total tally, board feet						
			4	124	560	767	118	987	302
			Percentage distribution						
			0.1	4.3	19.7	26.8	4.1	34.5	10.5

Distribution of above yields by thickness

Lumber thickness	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	Stakes
Inches	Percent within grade						
3/4	0.0	0.0	0.4	0.5	0.0	1.1	0.0
4/4	100.0	56.5	55.7	75.0	75.4	50.0	.0
5/4	.0	38.7	43.9	19.2	11.9	4.6	.0
6/4	.0	.0	.0	1.3	.0	.0	.0
7/4	.0	.0	.0	.0	.0	1.0	.0
8/4	.0	4.8	.0	2.6	5.1	39.3	.0
9/4	.0	.0	.0	1.4	7.6	4.0	.0
14/4	.0	.0	.0	.0	.0	.0	100.0
	Total tally, board feet						
	4	124	560	767	118	987	302



## PAPER BIRCH IN ALASKA

Table 4. – Construction class

Dry lumber grade yields, by scaling diameter, based on NHLA rules									
Scaling diameter	Logs	Total dry tally	Lumber grade						
			Fas	Sel	1C	2C	3A	3B	Stakes
Inches	No.	Board feet	Percent of total dry tally						
8	1	15	0.0	0.0	0.0	0.0	20.0	80.0	0.0
9	2	43	.0	.0	11.6	13.9	.0	32.6	41.9
10	2	71	.0	4.2	5.6	19.7	11.3	8.5	50.7
			Total tally, board feet						
All diameters	5	129	0	3	9	20	11	32	54
			Percentage distribution						
			0.0	2.3	7.0	15.5	8.5	24.8	41.9

Distribution of above yields by thickness							
Lumber thickness	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	Stakes
Inches	Percent within grade						
4/4	0.0	100.0	100.0	80.0	100.0	81.3	0.0
5/4	.0	.0	.0	20.0	.0	.0	.0
8/4	.0	.0	.0	.0	.0	18.7	.0
14/4	.0	.0	.0	.0	.0	.0	100.0
Total tally, board feet							
	0	3	9	20	11	32	54



PAPER BIRCH IN ALASKA



Table 5. — Local-use class

Dry lumber grade yields, by scaling diameter, based on NHLA rules

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
9	1	23	0.0	0.0	0.0	26.1	0.0	73.9
10	1	39	.0	.0	.0	23.1	23.1	53.8
11	2	66	.0	.0	.0	30.3	7.6	62.1
13	1	75	.0	14.7	9.3	33.3	.0	42.7
14	1	10	.0	.0	.0	.0	.0	100.0
			Total tally, board feet					
All diameters	6	213	0	11	7	60	14	121
			Percentage distribution					
			0.0	5.1	3.3	28.2	6.6	56.8

Distribution of above yields by thickness

Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	0.0	0.0	0.0	7.4		
4/4	.0	100.0	100.0	91.7	100.0	52.1		
5/4	.0	.0	.0	8.3	.0	3.3		
8/4	.0	.0	.0	.0	.0	13.2		
9/4	.0	.0	.0	.0	.0	24.0		
			Total tally, board feet					
			0	11	7	60	14	121

Table 6. — Lumber grade yields for paper birch in Alaska and Minnesota

Log grade	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	Stakes
Percent of total dry tally							
PAPER BIRCH IN ALASKA							
I	10.3	11.7	41.4	18.4	1.0	17.2	—
II	5.3	13.4	30.5	18.4	3.2	21.9	7.3
III	.1	4.3	19.7	26.8	4.1	34.5	10.5
PAPER BIRCH IN MINNESOTA							
I	20.0	28.2	25.3	12.4	7.3	6.8	—
II	10.1	19.3	21.9	24.1	19.2	5.4	—
III	.6	7.4	12.2	23.5	35.3	21.0	—



PAPER BIRCH IN ALASKA

Table 7. — Log grade I Overruns based on dry lumber tally<sup>1</sup>

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
13	2	119	170	150	-20.7	140	116	2.6
14	1	60	80	58	3.4	70	44	36.4
15	1	98	115	108	-9.3	110	100	-2.0
16	1	152	180	173	-12.1	160	149	2.0
Total	5	429	545	489	-12.3	480	409	4.9

<sup>1</sup> Throughout this study scale deductions for the International 1/4-inch log rule were obtained by the methods outlined in "Shortcuts for Cruisers and Scalers," by L. R. Grosenbaugh, U.S. Forest Serv. South, Forest Exp. Sta. Occas. Pap. 126, 1952. For each log, percent deductions were rounded to the nearest whole percent and board-foot deductions were rounded to the nearest board foot. Scale deductions for the Scribner Decimal-C log rule were computed to the nearest board foot in accordance with "The National Forest Log Scaling Handbook." These volumes, however, were not rounded to the nearest 10.

PAPER BIRCH IN ALASKA



Table 8. – Log grade II  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
10	4	154	160	153	0.7	120	113	36.3
11	12	627	705	679	-7.7	550	524	19.7
12	21	1,137	1,420	1,306	-12.9	1,230	1,088	4.5
13	6	427	510	485	-12.0	440	415	2.9
14	8	603	795	737	-18.2	690	614	-1.8
15	2	133	190	140	-5.0	180	111	19.8
16	1	70	130	87	-19.5	120	63	11.1
17	1	41	125	71	-42.3	120	53	-22.6
Total	55	3,192	4,035	3,658	-12.7	3,450	2,981	7.1

PAPER BIRCH IN ALASKA



Table 9. – Log grade III  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	14	280	270	258	8.5	220	205	36.6
9	26	680	735	695	-2.2	680	631	7.8
10	22	634	805	741	-14.4	660	580	9.3
11	13	406	525	485	-16.3	440	387	4.9
12	2	60	115	78	-23.1	100	49	22.4
13	6	356	555	475	-25.1	470	363	-1.9
14	6	341	510	439	-22.3	460	384	-11.2
15	2	105	190	175	-40.0	180	160	-34.4
Total	91	2,862	3,705	3,346	-14.5	3,210	2,759	3.7



## PAPER BIRCH IN ALASKA

Table 10. – Construction class  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	1	15	15	15	0.0	10	10	50.0
9	2	43	50	50	-14.0	50	50	-14.0
10	2	71	70	70	1.4	60	60	18.3
Total	5	129	135	135	-4.4	120	120	7.5



## PAPER BIRCH IN ALASKA

Table 11. – Local-use class  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
9	1	23	20	20	15.0	20	20	15.0
10	1	39	45	43	-9.3	30	28	39.3
11	2	66	90	77	-14.3	70	53	24.5
13	1	75	100	84	-10.7	80	58	29.3
14	1	10	100	67	-85.1	90	60	-83.3
Total	6	213	355	291	-26.8	290	219	-2.7

PAPER BIRCH IN ALASKA



Table 12. — All logs  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	15	295	285	273	8.1	230	215	37.2
9	29	746	805	765	-2.5	750	701	6.4
10	29	898	1,080	1,007	-10.8	870	781	15.0
11	27	1,099	1,320	1,241	-11.4	1,060	964	14.0
12	23	1,197	1,535	1,384	-13.5	1,330	1,137	5.3
13	15	977	1,335	1,194	-18.2	1,130	952	2.6
14	16	1,014	1,485	1,301	-22.1	1,310	1,102	-8.0
15	5	336	495	423	-20.6	470	371	-9.4
16	2	222	310	260	-14.6	280	212	4.7
17	1	41	125	71	-42.3	120	53	-22.6
Total	162	6,825	8,775	7,919	-13.8	7,550	6,488	5.2



## BALSAM POPLAR IN ALASKA

Table 13. — Log grade I

Dry lumber grade yields, by scaling diameter, based on NHLA rules								
Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
13	2	129	0.0	0.0	9.3	64.3	9.3	17.1
14	2	221	4.1	18.1	24.9	33.0	13.1	6.8
15	1	72	.0	.0	30.6	20.8	25.0	23.6
16	2	194	12.9	7.7	24.7	45.9	6.2	2.6
17	4	546	6.0	22.2	33.3	26.4	5.9	6.2
18	4	664	1.4	6.2	38.8	30.4	6.9	16.3
19	2	356	5.3	13.2	38.3	20.5	1.1	21.6
21	4	980	6.3	7.4	37.4	29.4	7.4	12.1
26	1	203	11.3	4.4	21.2	21.7	10.8	30.6
All diameters	22	3,365	Total tally, board feet					
			180	346	1,121	1,011	248	459
			Percentage distribution					
			5.4	10.3	33.3	30.0	7.4	13.6

Distribution of above yields by thickness							
Lumber thickness	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	
Inches	Percent within grade						
3/4	2.8	0.0	1.0	0.0	0.0	0.0	
4/4	92.8	87.9	93.9	85.4	87.9	64.7	
5/4	4.4	12.1	5.1	2.3	.0	.0	
8/4	.0	.0	.0	3.2	6.5	10.0	
9/4	.0	.0	.0	9.1	5.6	25.3	
	Total tally, board feet						
	180	346	1,121	1,011	248	459	

# BALSAM POPLAR IN ALASKA



Table 14. – Log grade II

## Dry lumber grade yields, by scaling diameter, based on NHLA rules

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
<b>Inches</b>	<b>No.</b>	<b>Board feet</b>	<b>Percent of total dry tally</b>					
10	1	40	0.0	15.0	0.0	75.0	0.0	10.0
11	5	320	.0	.0	14.1	41.9	11.2	32.8
12	4	260	.0	6.5	13.1	43.1	10.4	26.9
13	8	616	.8	2.1	10.6	38.3	5.2	43.0
14	6	506	1.0	7.7	17.8	42.7	9.1	21.7
15	10	1,071	1.9	5.0	21.7	39.3	7.2	24.9
16	6	778	.0	2.1	19.0	54.3	8.4	16.2
17	4	559	2.9	8.8	40.0	25.4	3.4	19.5
18	8	1,238	.0	1.8	24.0	42.9	8.0	23.3
19	3	577	5.0	4.9	24.6	40.2	11.1	14.2
20	1	200	.0	3.5	39.5	22.5	8.0	26.5
22	1	215	11.6	4.2	48.4	13.0	3.7	19.1
All diameters	57	6,380	<b>Total tally, board feet</b>					
			100	260	1,460	2,550	489	1,521
			<b>Percentage distribution</b>					
			1.6	4.1	22.9	40.0	7.6	23.8

## Distribution of above yields by thickness

Lumber thickness	Lumber grade					
	Fas	Sel	1C	2C	3A	3B
<b>Inches</b>	<b>Percent within grade</b>					
3/4	0.0	0.0	1.2	0.8	1.2	0.3
4/4	100.0	96.2	92.5	88.7	74.8	63.8
5/4	.0	3.8	6.3	5.3	.0	.8
8/4	.0	.0	.0	2.7	7.4	17.2
9/4	.0	.0	.0	2.5	16.6	17.9
<b>Total tally, board feet</b>						
	100	260	1,460	2,550	489	1,521



## BALSAM POPLAR IN ALASKA

Table 15. — Log grade III

Dry lumber grade yields, by scaling diameter, based on NHLA rules								
Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	5	112	0.0	0.0	0.0	51.8	12.5	35.7
9	9	265	.0	.0	3.0	40.4	10.9	45.7
10	11	469	.0	.0	7.5	47.3	6.0	39.2
11	13	554	.0	.0	.9	32.5	13.9	52.7
12	8	276	.0	.0	4.3	24.6	15.2	55.9
13	10	562	.0	.0	6.2	35.1	15.3	43.4
14	10	655	.0	.0	.6	33.9	20.9	44.6
15	4	358	.0	.0	7.5	49.8	17.0	25.7
16	3	306	.0	.0	19.0	54.2	10.1	16.7
17	3	266	.0	.0	6.8	40.6	21.8	30.8
18	1	118	.0	.0	6.8	49.9	29.7	13.6
All diameters	77	3,941	Total tally, board feet					
			0	0	210	1,565	598	1,568
			Percentage distribution					
			0	0	5.3	39.7	15.2	39.8

Distribution of above yields by thickness						
Lumber thickness	Lumber grade					
	Fas	Sel	1C	2C	3A	3B
Inches	Percent within grade					
3/4	0.0	0.0	0.0	0.0	0.3	0.0
4/4	.0	.0	87.6	90.0	84.0	57.8
5/4	.0	.0	12.4	5.7	1.0	1.3
6/4	.0	.0	.0	.5	.0	.0
8/4	.0	.0	.0	2.4	6.7	24.7
9/4	.0	.0	.0	1.4	8.0	16.2
	Total tally, board feet					
	0	0	210	1,565	598	1,568



# BALSAM POPLAR IN ALASKA



Table 16. – Construction class

## Dry lumber grade yields, by scaling diameter, based on NHLA rules

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	3	92	0.0	0.0	0.0	13.0	4.3	82.7
9	3	92	.0	.0	.0	42.4	12.0	45.6
10	2	93	.0	.0	7.5	51.6	.0	40.9
14	1	63	.0	.0	25.4	38.1	.0	36.5
			Total tally, board feet					
All diameters	9	340	0	0	23	123	15	179
			Percentage distribution					
			0	0	6.8	36.2	4.4	52.6

## Distribution of above yields by thickness

Lumber thickness	Lumber grade					
	Fas	Sel	1C	2C	3A	3B
Inches	Percent within grade					
3/4	0.0	0.0	0.0	0.0	0.0	0.0
4/4	.0	.0	100.0	91.9	100.0	49.1
5/4	.0	.0	.0	.0	.0	2.8
8/4	.0	.0	.0	8.1	.0	31.3
9/4	.0	.0	.0	.0	.0	16.8
Total tally, board feet						
	0	0	23	123	15	179



## BALSAM POPLAR IN ALASKA

Table 17. – Local-use class

Dry lumber grade yields, by scaling diameter, based on NHLA rules								
Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	1	15	0.0	0.0	0.0	0.0	0.0	100.0
9	3	74	.0	.0	.0	4.1	36.5	59.4
11	4	96	.0	.0	.0	16.7	9.4	73.9
12	1	31	.0	.0	.0	29.0	6.5	64.5
			Total tally, board feet					
All diameters	9	216	0	0	0	28	38	150
			Percentage distribution					
			0	0	0	13.0	17.6	69.4

Distribution of above yields by thickness								
Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	0.0	0.0	5.3	0.0		
4/4	.0	.0	.0	78.6	65.7	72.7		
5/4	.0	.0	.0	21.4	.0	.0		
6/4	.0	.0	.0	.0	7.9	.0		
8/4	.0	.0	.0	.0	21.1	13.3		
9/4	.0	.0	.0	.0	.0	14.0		
			Total tally, board feet					
			0	0	0	28	38	150

BALSAM POPLAR IN ALASKA



Table 18. – Log grade I

Dry lumber grade yields, by scaling diameter, graded bark pockets no defect

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
<b>Inches</b>	<b>No.</b>	<b>Board feet</b>	<b>Percent of total dry tally</b>					
13	2	129	0.0	0.0	9.3	64.3	9.3	17.1
14	2	221	4.1	18.1	24.9	33.0	13.1	6.8
15	1	72	.0	.0	30.6	20.8	25.0	23.6
16	2	194	12.9	7.7	24.7	45.9	6.2	2.6
17	4	546	14.7	15.6	38.2	21.0	5.9	4.6
18	4	664	3.8	6.6	43.2	26.8	5.6	14.0
19	2	356	9.3	13.2	39.9	28.9	1.1	7.6
21	4	980	24.9	4.9	32.8	25.3	3.7	8.4
26	1	203	15.8	.0	23.6	26.6	5.9	28.1
<b>Total tally, board feet</b>			448	279	1,145	958	192	343
<b>Percentage distribution</b>			13.3	8.3	34.0	28.5	5.7	10.2
All diameters	22	3,365						

Distribution of above yields by thickness

Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
<b>Inches</b>	<b>Percent within grade</b>							
3/4	1.1	0.0	1.0	0.0	0.0	0.0		
4/4	88.0	92.5	95.8	84.7	84.4	52.8		
5/4	10.9	7.5	3.2	2.4	.0	.0		
8/4	.0	.0	.0	3.3	8.3	13.4		
9/4	.0	.0	.0	9.6	7.3	33.8		
<b>Total tally, board feet</b>			448	279	1,145	958	192	343



## BALSAM POPLAR IN ALASKA

Table 19. – Log grade II

Dry lumber grade yields, by scaling diameter, graded bark pockets no defect								
Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
10	1	40	0.0	15.0	0.0	75.0	0.0	10.0
11	5	320	.0	.0	15.6	50.3	9.1	25.0
12	4	260	.0	6.5	13.1	43.1	10.4	26.9
13	8	616	2.6	2.1	24.1	37.8	2.9	30.5
14	6	506	1.0	7.7	20.0	41.4	9.1	20.8
15	10	1,071	6.4	3.7	33.0	30.1	4.5	22.3
16	6	778	.0	2.1	23.1	50.2	8.4	16.2
17	4	559	5.2	8.4	40.1	33.8	1.8	10.7
18	8	1,238	2.8	1.1	37.2	34.9	8.0	16.0
19	3	577	5.0	4.9	24.6	43.7	11.1	10.7
20	1	200	.0	3.5	43.5	37.0	8.0	8.0
22	1	215	11.6	9.3	43.3	21.4	.0	14.4
All diameters	57	6,380	Total tally, board feet					
			207	247	1,872	2,453	422	1,179
			Percentage distribution					
			3.2	3.9	29.3	38.5	6.6	18.5

Distribution of above yields by thickness								
Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	1.0	0.8	1.4	0.3		
4/4	100.0	96.0	94.1	88.2	70.9	53.3		
5/4	.0	4.0	4.9	5.6	.0	1.0		
8/4	.0	.0	.0	2.8	8.5	22.2		
9/4	.0	.0	.0	2.6	19.2	23.2		
			Total tally, board feet					
			207	247	1,872	2,453	422	1,179

# BALSAM POPLAR IN ALASKA



Table 20. – Log grade III

## Dry lumber grade yields, by scaling diameter, graded bark pockets no defect

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	5	112	0.0	0.0	0.0	51.8	12.5	35.7
9	9	265	.0	.0	4.9	38.5	10.9	45.7
10	11	469	.0	.0	7.5	47.3	6.0	39.2
11	13	554	.0	.0	3.6	36.8	13.9	45.7
12	8	276	.0	.0	6.5	33.3	11.6	48.6
13	10	562	.0	.0	8.2	35.4	13.7	42.7
14	10	655	.0	.0	.6	35.6	19.2	44.6
15	4	358	2.0	1.1	22.1	40.2	14.8	19.8
16	3	306	.0	.0	20.3	52.9	10.1	16.7
17	3	266	.0	.0	6.8	40.6	21.8	30.8
18	1	118	.0	.0	6.8	49.9	29.7	13.6
All diameters	77	3,941	Total tally, board feet					
			7	4	303	1,583	560	1,484
			Percentage distribution					
			0.1	0.2	7.7	40.2	14.2	37.6

## Distribution of above yields by thickness

Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	0.0	0.0	0.4	0.0		
4/4	100.0	100.0	91.4	90.0	82.8	55.5		
5/4	.0	.0	8.6	5.6	1.1	1.4		
6/4	.0	.0	.0	.5	.0	.0		
8/4	.0	.0	.0	2.5	7.1	26.0		
9/4	.0	.0	.0	1.4	8.6	17.1		
			Total tally, board feet					
			7	4	303	1,583	560	1,484



## BALSAM POPLAR IN ALASKA

Table 21. — Construction class

Dry lumber grade yields, by scaling diameter, graded bark pockets no defect								
Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	3	92	0.0	0.0	0.0	13.0	4.3	82.7
9	3	92	.0	.0	.0	42.4	12.0	45.6
10	2	93	.0	.0	7.5	51.6	.0	40.9
14	1	63	.0	.0	25.4	38.1	.0	36.5
			Total tally, board feet					
All diameters	9	340	0	0	23	123	15	179
			Percentage distribution					
			0	0	6.8	36.2	4.4	52.6

Distribution of above yields by thickness								
Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4/4	.0	.0	100.0	91.9	100.0	49.1		
5/4	.0	.0	.0	.0	.0	2.8		
8/4	.0	.0	.0	8.1	.0	31.3		
9/4	.0	.0	.0	.0	.0	16.8		
			Total tally, board feet					
			0	0	23	123	15	179

BALSAM POPLAR IN ALASKA



Table 22. – Local-use class

Dry lumber grade yields, by scaling diameter, graded bark pockets no defect

Scaling diameter	Logs	Total dry tally	Lumber grade					
			Fas	Sel	1C	2C	3A	3B
Inches	No.	Board feet	Percent of total dry tally					
8	1	15	0.0	0.0	0.0	0.0	0.0	100.0
9	3	74	.0	.0	.0	4.1	36.5	59.4
11	4	96	.0	.0	.0	16.7	9.4	73.9
12	1	31	.0	.0	.0	29.0	6.5	64.5
			Total tally, board feet					
All diameters	9	216	0	0	0	28	38	150
			Percentage distribution					
			0	0	0	13.0	17.6	69.4

Distribution of above yields by thickness

Lumber thickness	Lumber grade							
	Fas	Sel	1C	2C	3A	3B		
Inches	Percent within grade							
3/4	0.0	0.0	0.0	0.0	5.3	0.0		
4/4	.0	.0	.0	78.6	65.7	72.7		
5/4	.0	.0	.0	21.4	.0	.0		
6/4	.0	.0	.0	.0	7.9	.0		
8/4	.0	.0	.0	.0	21.1	13.3		
9/4	.0	.0	.0	.0	.0	14.0		
			Total tally, board feet					
			0	0	0	28	38	150

Table 23. — Lumber grade yields for balsam poplar in Alaska and eastern cottonwood

Log grades	Lumber grade						
	Fas	Sel	1C	2C	3A	3B	3C
Percent of total dry tally							
<b>BALSAM POPLAR IN ALASKA</b>							
I	5.4	10.3	33.3	30.0	7.4	13.6	---
II	1.6	4.1	22.9	40.0	7.6	23.8	---
III	.0	.0	5.3	39.7	15.2	39.8	---
<b>BALSAM POPLAR IN ALASKA (BARK POCKETS NO DEFECT)</b>							
I	13.3	8.3	34.0	28.5	5.7	10.2	---
II	3.2	3.9	29.3	38.5	6.6	18.5	---
III	.1	.2	7.7	40.2	14.2	37.6	---
<b>EASTERN COTTONWOOD</b>							
I	34.4	6.4	31.1	23.7	---	---	4.4
II	8.0	3.9	39.9	40.3	---	---	7.9
III	1.3	1.0	30.5	59.2	---	---	8.0



**BALSAM POPLAR IN ALASKA**

Table 24. – Log grade I  
Overruns based on dry lumber tally



Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
13	2	129	185	161	-19.9	150	121	6.6
14	2	221	235	219	.9	200	180	22.8
15	1	72	135	111	-35.1	120	92	-21.7
16	2	194	260	232	-16.4	240	207	-6.3
17	4	546	740	637	-14.3	660	538	1.5
18	4	664	830	766	-13.3	780	698	-4.9
19	2	356	450	392	-9.2	420	354	.6
21	4	980	1,240	1,101	-11.0	1,170	1,017	-3.6
26	1	203	290	238	-14.7	280	216	-6.0
Total	22	3,365	4,365	3,857	-12.8	4,020	3,423	-1.7

**BALSAM POPLAR IN ALASKA**

Table 25. – Log grade II  
Overruns based on dry lumber tally



Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
10	1	40	65	57	-29.8	60	48	-16.7
11	5	320	355	337	-5.0	280	260	23.1
12	4	260	265	261	-.4	230	226	15.0
13	8	616	725	681	9.5	600	552	11.6
14	6	506	610	543	-6.8	530	459	10.2
15	10	1,071	1,325	1,213	-11.7	1,200	1,067	.4
16	6	778	885	828	-6.0	800	726	7.2
17	4	559	685	641	-12.8	620	568	-1.6
18	8	1,238	1,510	1,419	-12.8	1,410	1,302	-4.9
19	3	577	780	626	-7.8	720	548	5.3
20	1	200	290	246	-18.7	280	228	-12.3
22	1	215	260	208	3.4	250	187	15.0
Total	57	6,380	7,755	7,060	-9.6	6,980	6,171	3.4



**BALSAM POPLAR IN ALASKA**

**Table 26. – Log grade III  
Overruns based on dry lumber tally**

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	5	112	125	125	-10.4	80	80	40.0
9	9	265	345	335	-20.9	300	291	-8.9
10	11	469	570	523	-10.3	490	446	5.2
11	13	554	685	637	-13.0	520	481	15.2
12	8	276	445	406	-32.0	390	341	-19.1
13	10	562	795	745	-24.6	670	624	-9.9
14	10	655	990	904	-27.5	870	780	-16.0
15	4	358	440	425	-15.8	420	406	-11.8
16	3	306	420	373	-18.0	380	320	-4.4
17	3	266	340	336	-20.8	320	316	-15.8
18	1	118	170	151	-21.9	160	134	-11.9
Total	77	3,941	5,325	4,960	-20.5	4,600	4,219	-6.6



**BALSAM POPLAR IN ALASKA**

**Table 27. – Construction class  
Overruns based on dry lumber tally**

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	3	92	100	100	-8.0	70	70	31.4
9	3	92	125	125	-26.4	90	90	2.2
10	2	93	95	95	-2.1	90	90	3.3
14	1	63	80	80	-21.3	70	70	-10.0
Total	9	340	400	400	-15.0	320	320	6.2

BALSAM POPLAR IN ALASKA



Table 28. – Local-use class  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	1	15	15	15	0.0	10	10	50.0
9	3	74	85	85	-12.9	80	80	-7.5
11	4	96	170	167	-42.5	150	147	-34.7
12	1	31	45	40	-22.5	40	35	-11.4
Total	9	216	315	307	-29.6	280	272	-20.6

BALSAM POPLAR IN ALASKA



Table 29. – All logs  
Overruns based on dry lumber tally

Scaling diameter	Logs	Total dry tally	International 1/4-inch log rule			Scribner Decimal-C log rule		
			Scale		Overrun	Scale		Overrun
			Gross	Net		Gross	Net	
Inches	No.	Board feet	Board feet	Board feet	Percent	Board feet	Board feet	Percent
8	9	219	240	240	-8.8	160	160	36.9
9	15	431	555	545	-20.9	470	461	-6.5
10	14	602	730	675	-10.8	640	584	3.1
11	22	970	1,210	1,141	-15.0	950	888	9.2
12	13	567	755	707	-19.8	660	602	-5.8
13	20	1,307	1,705	1,587	-17.6	1,420	1,297	.8
14	19	1,445	1,915	1,746	-17.2	1,670	1,489	-3.0
15	15	1,501	1,900	1,749	-14.2	1,740	1,565	-4.1
16	11	1,278	1,565	1,433	-10.8	1,420	1,253	2.0
17	11	1,371	1,765	1,614	-15.1	1,600	1,422	-3.6
18	13	2,020	2,510	2,336	-13.5	2,350	2,134	-5.3
19	5	933	1,230	1,018	-8.3	1,140	902	3.4
20	1	200	290	246	-18.7	280	228	-12.3
21	4	980	1,240	1,101	-11.0	1,170	1,017	-3.6
22	1	215	260	208	3.4	250	187	15.0
26	1	203	290	238	-14.7	280	216	-6.0
Total	174	14,242	18,160	16,584	-14.1	16,200	14,405	-1.1

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**Hanks, Leland F., and Carl W. Swanson**

1967. Lumber grade yields from paper birch and balsam poplar logs in the Susitna River Valley, Alaska. U.S. Forest Serv. Res. Pap. PNW-51, 30 pp., illus. Institute of Northern Forestry, Pacific Northwest Forest & Range Experiment Station, Juneau, Alaska.

A study was conducted at Wasilla, Alaska, in 1964 to determine the lumber grade recovery from paper birch and balsam poplar logs. Actual recoveries are summarized by scaling diameter for each of the three U.S. Forest Service log grades. This information, when coupled with pertinent lumber prices, may be used to estimate the value of lumber to be sawed from birch or poplar logs in Alaska.

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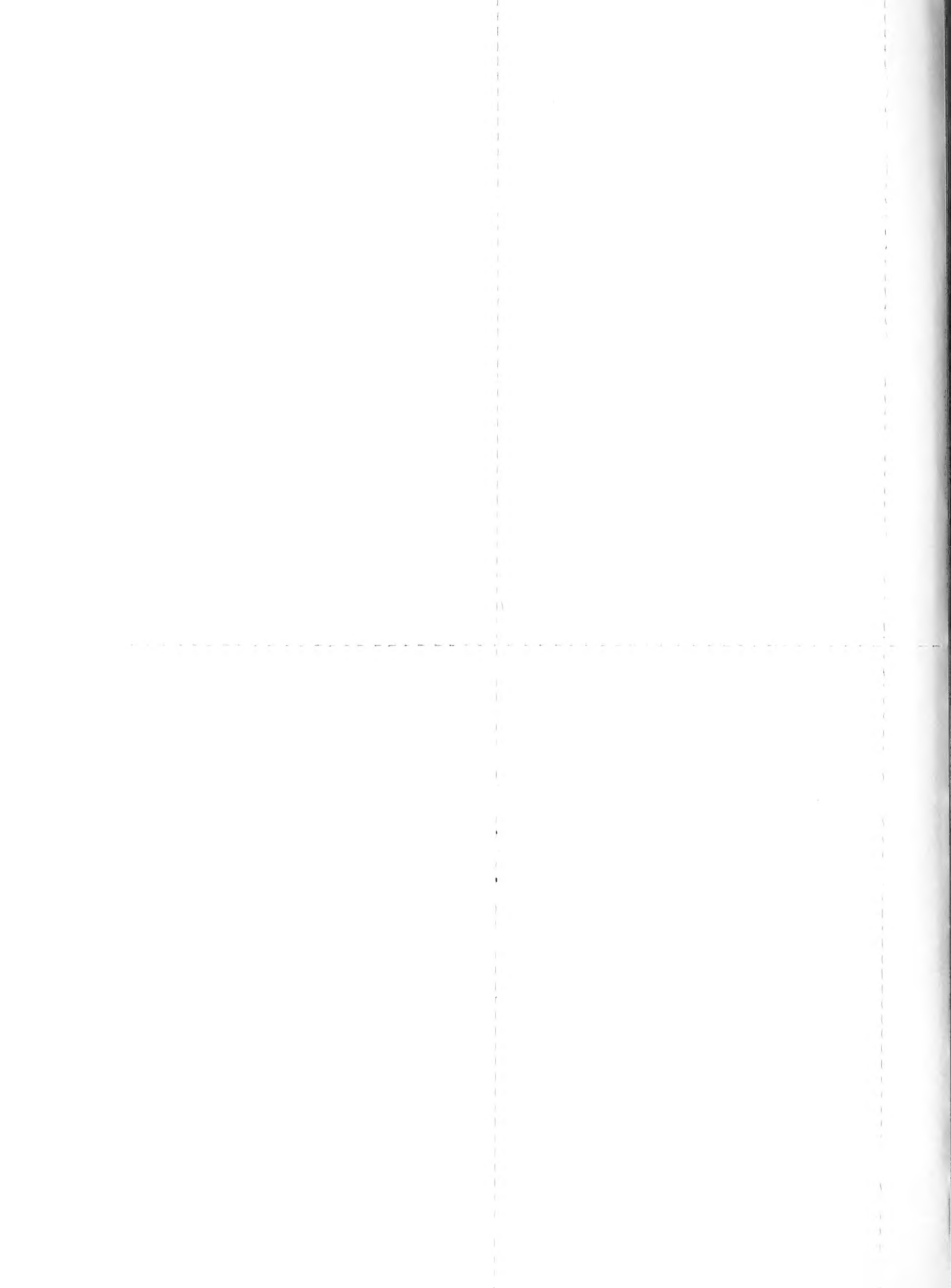
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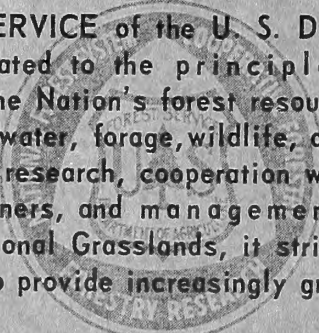
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