

EFFECT OF SLASH ON ASPEN REGENERATION (WINTER AND SUMMER CUTS) HUDSON BAY, SASKATCHEWAN

LIBRARY
ENVIRONMENT CANADA
NORTHERN FOREST RESEARCH CENTRE
5220 50TH STREET
EDMONTON, ALBERTA T6H 3S5

Demonstration MS 077

by J. M. Shoup

**FOREST RESEARCH LABORATORY
WINNIPEG, MANITOBA
INTERNAL REPORT MS-114**

**CANADIAN FORESTRY SERVICE
DEPARTMENT OF FISHERIES AND FORESTRY
APRIL, 1970**

**EFFECT OF SLASH ON ASPEN REGENERATION
(WINTER AND SUMMER CUTS). HUDSON BAY, SASKATCHEWAN**

Demonstration MS-077

by

J.M. Shoup

**LIBRARY
ENVIRONMENT CANADA
NORTHERN FOREST RESEARCH CENTRE
5320 - 122ND STREET
EDMONTON, ALBERTA T6H 3S5**

FOREST RESEARCH LABORATORY

WINNIPEG, MANITOBA

INTERNAL REPORT MS-114

CANADIAN FORESTRY SERVICE

APRIL 1970

CONTENTS

	Page
INTRODUCTION	1
WINTER CUT	1
Regeneration in relation to slash treatment	2
Effect of slash on regeneration	2
Changes in sucker density, 1966-1969	2
SUMMER CUT	3
Regeneration in relation to slash treatment	3
Effect of slash on regeneration	3
Effect of underbrush on regeneration	3
Effect of skid trail on regeneration	4
FUTURE WORK	4
SUMMARY	4
REFERENCES	5

EFFECT OF SLASH ON ASPEN REGENERATION
(WINTER AND SUMMER CUTS) HUDSON BAY, SASKATCHEWAN

Demonstration MS-077

by

J.M. Shoup¹

INTRODUCTION

During the winter of 1965-66 the Department of Forestry and Rural Development in co-operation with MacMillan Bloedel (Saskatchewan) Limited began a study to determine the affect of unmerchantable residual over-story and the accumulation of logging slash on the restocking of cut-over trembling aspen (Populus tremuloides Michx.) stands (Shoup 1967 and 1968a). The study areas are located approximately 23 miles south of Hudson Bay, Saskatchewan (Figure 1).

The 1968 assessment of aspen regeneration resulting from the winter cut of 1965-66 indicated that abundant aspen regeneration was obtained under the various conditions of slash disposal. The 1968 assessment of aspen regeneration on the 1967 summer cut indicated that a wide range of aspen regeneration was obtained for the different treatments (Shoup 1968b).

A preliminary analysis was carried out on the winter cut with respect to the relationships between original density, natural thinning, and the number of growing seasons (1966-69) since the original stand was cut.

WINTER CUT

Aspen regeneration on the winter cut of 1965-66 was reassessed during the period August 4-5, 1969.

¹Forest Research Technician, Liaison and Services Section (Silviculture), Canadian Forestry Service, Department of Fisheries and Forestry, Winnipeg, Manitoba.

Regeneration in relation to slash treatments

All treatments continue to show similar results as found in 1968 with nearly full stocking on each strip. There was little change in the number of suckers per acre from 1968 (Table 1).

Aspen suckers were tallest on strips 2 and 4 where they attained a height of 8.4 and 8.2 feet respectively, and those on strip 3 were 7.4 feet (Table 1). Balsam poplar (Populus balsamifera L.) suckers attained a height of 6.6 feet on strip 4, 6.0 feet on strip 3 and 5.6 feet on strip 2.

Effect of slash on regeneration

The results were similar to those obtained in previous years in that regeneration was better when slash was absent, however, slash conditions did not affect height growth (Table 2)

The number of suckers per acre have not changed greatly from 1968 (Table 2).

Changes in sucker density, 1966-1969

A preliminary analysis was carried out to determine the effect of original sucker density on natural thinning during the four growing seasons since the stand was cut. For this analysis, data obtained from strips 2 and 4 were combined. Data from strip 3 was not used because of the presence of a large slough.

The density of each of the original 400 1/2-milacre was determined; densities obtained ranged from 6,000 to 70,000 stems per acre. Seven plots (usually) were selected at random from each density class (6, 8, 12, 14, 16, etc.) and each three adjacent classes were pooled (21 plots) to provide a graph grouping. Nine graph groupings were obtained (8, 14, 20, 26, etc.). The average number of suckers per acre following two, three, and four growing seasons shows the effect of original sucker density on natural thinning (Figure 2).

Although only four growing seasons have passed since the time of sucker initiation, some general trends can be observed. There has been little change in density in the groups of 8,000, 14,000 and 20,000 stems per acre. However, in the 26,000 stems per acre and higher groups, there is a good correlation of increased natural thinning with an increased density. The greatest mortality occurs in the first two years following sucker establishment.

Subsequent field examination and additional analysis should provide valuable information on the minimum density of suckers required to satisfactorily stock cut-over aspen stands.

SUMMER CUT

The aspen regeneration on the summer cut of 1967 was reassessed during the period August 6-7, 1969.

Regeneration in relation to slash treatments

The number of suckers per acre showed the same trend as in 1968 with considerable variability between the four strips. The highest number of suckers was found on strip 4 with decreasing amounts on strips 2 and 3 and the least on strip 1. Stocking was 100 per cent on all strips except strip 1 (Table 3).

Both species of poplar attained the greatest height on strips 2 and 4. However, for trembling aspen the increase in height from 1968 to 1969 was about the same for all four strips.

It is of interest to note that strip 1 was cut at a later date (August 4, 1967) than the other strips and had the least amount of regeneration in 1967 (5,683 suckers/acre). Strip 1 increased to 18,343 suckers per acre in 1968 and remained about the same (18,514/acre) in 1969. The other strips decreased in 1968 and were again reduced in 1969.

Effect of slash on regeneration

Results were similar to those obtained in 1968 in that regeneration was better where slash was absent. Trembling aspen height growth was comparable on all areas (Table 4).

Please note: The 1968 results shown in Table 4 (Shoup 1968b) contains 2 errors. Under number of suckers per acre for balsam poplar for limbs only, it should read 1,018 not 1,754 and for limbs and logs it should read 1,294 not 12,941.

Effect of underbrush on regeneration

The total number of suckers per acre growing with hazel (Corylus cornuta Marsh.) showed a decrease in 1969 of about 4,000 under light and medium conditions from previous year but increased 2,000 suckers per acre under heavy underbrush condition (Table 5). The following table shows the changes in sucker density during the period 1967-1969 under the various degrees of underbrush condition:

<u>Year</u>	<u>Number of suckers per acre</u>		
	<u>Light</u>	<u>Medium</u>	<u>Heavy</u>
1967	26,457	17,167	14,000
1968	30,300	25,417	16,286
1969	26,267	21,667	18,000

If the above trend continues, it would appear that within the next year or two the initial effects of underbrush should be insignificant. The average height of the suckers was about the same for the three classes of underbrush conditions (Table 5).

Effect of skid trail on regeneration

The skid trail which occurred in strips 2, 3 and 4 was completely stocked with 30,500 trembling aspen suckers per acre (down 7,000 from 1968) and 105 balsam poplar suckers per acre. Trembling aspen sucker height growth at 4.2 feet was slightly less than the adjoining areas, while balsam poplar at 3.2 feet was about the same.

FUTURE WORK

In the summer of 1970 the regeneration quadrats on the winter and summer cuts will be reexamined.

SUMMARY

On the winter cut abundant trembling aspen regeneration was found on all treated areas and under all slash conditions; the number of suckers per acre was unchanged from that of the previous year.

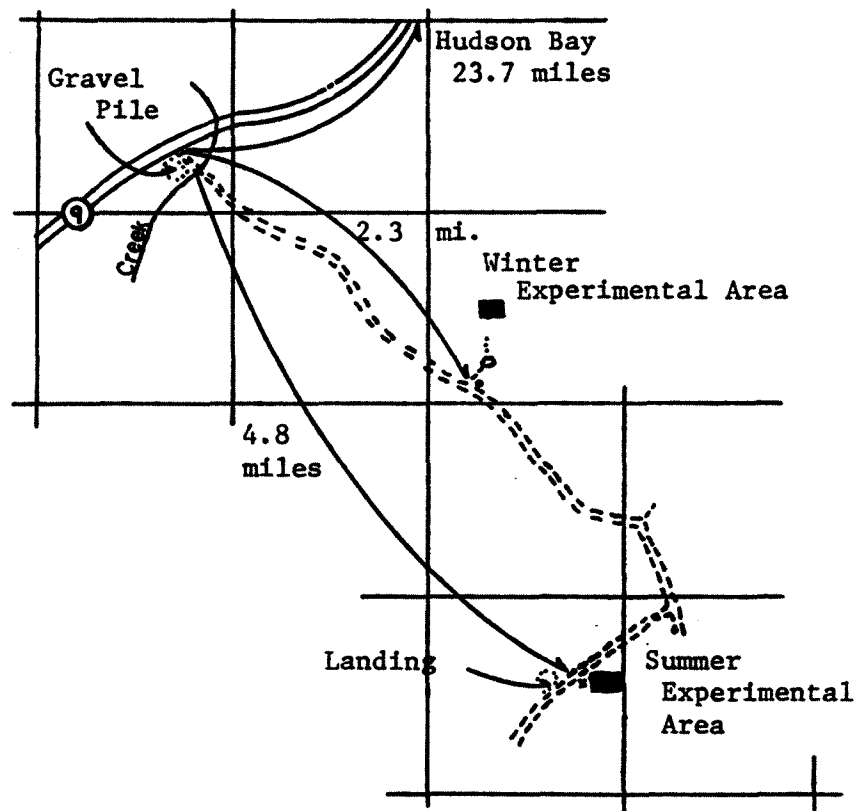
On the summer cut abundant aspen regeneration was found on all treated areas and under all slash conditions. The number of suckers per acre had not changed on strip 1, but was reduced on the other strips. This may be attributed to a later cutting date during the growing season for strip 1 which resulted in significantly less stems per acre being established on this strip.

Results on both areas indicate that although slash does slightly reduce suckering, no effect was found on the level of stocking.

After four growing seasons there has been no appreciable reduction in numbers of suckers in density classes up to 20,000 stems per acre. Densities of 26,000 stems per acre and higher show an appreciable reduction in numbers of suckers per acre and natural thinning was greater on the higher density classes.

REFERENCES

- Shoup, J.M. 1967. Effect of slash on aspen regeneration (winter cut), Hudson Bay, Saskatchewan. Canada, Department of Forestry and Rural Development, For. Fr., For. Res. Lab., Winnipeg, Man., Int. Rep. MS-50, 10 p.
- Shoup, J.M. 1968a. Effect of slash on aspen regeneration (winter and summer cuts), Hudson Bay, Saskatchewan. Canada, Department of Forestry and Rural Development, For. Br., For. Res. Lab., Winnipeg, Man., Int. Rep. MS-73, 13 p.
- Shoup, J.M. 1968b. Effect of slash on aspen regeneration (winter and summer cuts), Hudson Bay, Saskatchewan. Canada, Department of Fisheries and Forestry, For. Br., For. Res. Lab., Winnipeg, Man., Int. Rep. MS-79, 9 p.



Legend

Red Stake, Red Painted Aspen .
Yellow Plaque on Post x

Scale: 0 $\frac{1}{4}$ $\frac{1}{2}$ 1 mile

FIGURE 1: Location of Experimental Areas, Winter and Summer Cuts, Sections 22 and 24, Twp. 41, Rge. 4W 2nd, Hudson Bay, Saskatchewan.

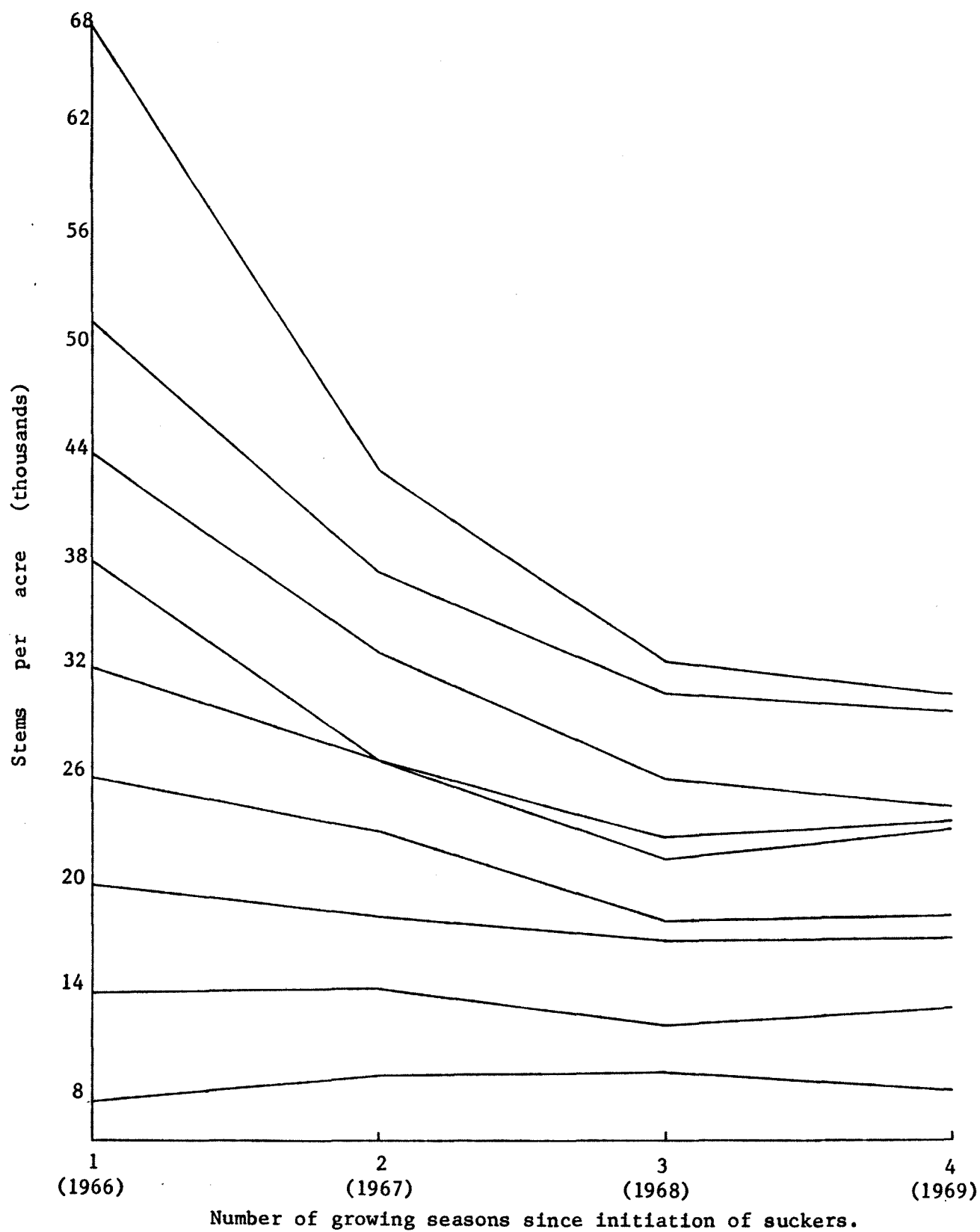


FIGURE 2. The effect of original sucker density on natural thinning, 1966-1969.

TABLE 1
EFFECT OF CUTTING AND SLASH DISPOSAL METHODS ON REGENERATION
HUDSON BAY - WINTER CUT (JANUARY 1966)
AUGUST 1969

Strip ¹ No.	Per Cent Stocking and Number of Suckers per Acre						Average Height of Tallest Sucker on Quadrats		Basis: Number of quadrats examined (1/2000-acre)
	Trembling aspen %	Balsam poplar %	Total %	Trembling aspen No.	Balsam poplar No.	Total No.	Trembling aspen(ft.)	Balsam poplar(ft.)	
2	100.0	6.5	100.0	19,050	273	19,324	8.4	5.6	139
3	97.0	15.8	98.0	13,802	812	14,614	7.4	6.0	101
4	100.0	25.6	100.0	16,175	1,538	17,712	8.2	6.6	160

- ¹ 2 - Normal logging; all slash removed.
3 - Normal logging; non-commercial trees felled.
4 - Combination 2 and 3.

TABLE 2

EFFECT OF SLASH ON REGENERATION
HUDSON BAY - WINTER CUT (JANUARY 1966)
AUGUST 1969

Slash condition	Number of Suckers per Acre			Av. Height of Tallest Sucker on Quadrats		Per Cent Stocking		Basis: Number of quadrats examined (1/2000-acre)
	Trembling aspen No.	Balsam poplar No.	Total No.	Trembling aspen (ft.)	Balsam poplar (ft.)	Trembling aspen %	Balsam poplar (%)	
Limbs only	15,544	895	16,438	8.1	6.1	98.2	17.5	114
Logs only	16,829	1,063	17,892	8.3	6.8	99.1	16.2	111
Limbs and logs	14,206	1,088	15,294	8.0	6.1	100.0	19.1	68
Nil	18,916	673	19,589	8.0	6.2	100.0	14.0	107

TABLE 3
EFFECT OF CUTTING AND SLASH DISPOSAL METHODS ON REGENERATION
HUDSON BAY - SUMMER CUT (JULY 1967)
AUGUST 1969

Strip ¹ No.	Per Cent Stocking and Number of Suckers per Acre						Av. Height of Tallest Sucker on Quadrats		Basis: Number of quadrats examined (1,200-acre)
	Trembling aspen %	Balsam poplar %	Total No. %	Trembling aspen No.	Balsam poplar No.	Total No.	Trembling aspen (ft.)	Balsam poplar (ft.)	
1	98.1	16.2	98.1	17,775	762	18,514	3.8	2.4	105
2	100.0	40.7	100.0	31,520	3,333	34,853	6.2	3.9	150
3	100.0	21.2	100.0	30,715	1,258	31,974	5.2	3.7	151
4	100.0	38.3	100.0	50,567	2,683	53,250	5.9	4.0	120

- ¹
1 - Normal logging; no slash disposal.
2 - Normal logging; all slash removed.
3 - Normal logging; non-commercial trees felled.
4 - Combination 2 and 3.

TABLE 4
EFFECT OF SLASH ON REGENERATION
HUDSON BAY - SUMMER CUT (JULY 1967)
AUGUST 1969

Slash condition	No. of Suckers Per Acre			Av. Height of Tallest Sucker on Quadrats		Per Cent Stocking		Basis: Number of quadrats examined (1/2000-acre)
	Trembling aspen no.	Balsam poplar no.	Total no.	Trembling aspen (ft.)	Balsam poplar (ft.)	Trembling aspen (%)	Balsam poplar (%)	
Limbs only	23,220	1,322	24,542	5.0	3.1	100.0	18.6	59
Logs only	29,186	1,895	31,081	5.5	3.9	100.0	29.1	172
Limbs & logs	26,820	1,179	28,000	5.2	4.0	100.0	20.5	39
Nil	38,453	2,508	40,961	5.4	3.6	99.2	34.0	256

TABLE 5
EFFECT OF UNDERBRUSH ON REGENERATION

HUDSON BAY - SUMMER CUT (JULY 1967)

AUGUST 1969

Underbrush ¹	Per Cent Stocking and Number of Suckers Per Acre						Average Height of Tallest Sucker on Quadrats		Basis: Number of quadrats examined (1/2000-acre
	Trembling aspen (%)	Balsam poplar (%)	Total %	Trembling aspen number	Balsam poplar number	Total number	Trembling aspen (ft.)	Balsam poplar (ft.)	
*Light	100.0	26.7	100.0	25,100	1,167	26,267	5.4	3.8	60
Medium	100.0	33.3	100.0	19,667	2,000	21,667	5.4	3.5	24
Heavy	100.0	28.6	100.0	17,428	572	18,000	5.6	3.0	7

¹ Underbrush - hazel (Corylus cornuts March.).

*Light - underbrush shading 25-50% of ground.
Medium - underbrush shading 50-75% of ground.
Heavy - underbrush shading 75-100% of ground.