SILVICULTURAL OPERATIONS RIDING MOUNTAIN FOREST EXPERIMENTAL AREA

by
R. H. M. Pratt

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INTRODUCTION

This report outlines the silvicultural operations that were carried out in the Riding Mountain Forest Experimental Area during the 1965-1966 fiscal year. As this work progresses cutting methods and some silvicultural treatments have been revised, however the general silvicultural program has developed in accordance with the original plan submitted in 1960.

The 1965-66 silvicultural program included: 38 acres of white spruce planting and 520,000 f.b.m. of white spruce sawlogs were marked and removed under the terms of timber sale No. 65-1. Stand improvement projects such as thinning and releasing young spruce stands growing under dense aspen overstorey, pruning potential white spruce crop trees, and herbicide treatments to release white spruce plantations were continued. In addition, 15 acres of land were cleared in the research area for aspen silviculture.

Three miles of new access roads were constructed and fences were built to protect research projects from animal damage.

REGENERATION SURVEY

One of the main objectives of the silvicultural operations program is to obtain prompt and adequate regeneration in all cut-over areas.

Research has shown that white spruce regeneration can readily be obtained by eliminating the dense hazel understorey and exposing mineral soil to natural white spruce seedfall. To date, the best method of doing this is by scalping with a bulldozer blade. In 1962, 362 acres were scalped to mineral soil in compartment 6 prior to salvage logging.

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[1] Technician (Forest Research), Department of Forestry of Canada, Manitoba-Saskatchewan Region, Winnipeg, Manitoba.

In May 1965 after the salvage logging was completed, a regeneration survey was carried out on the scarified area to evaluate white spruce regeneration. This survey was made on continuous lines of mil-acre quadrats which were run across the scarified area at 10-chain intervals. Each quadrat was classified as productive or non-productive[2], and productive quadrats as scarified or not scarified. Productive quadrats were recorded as stocked or not stocked with regeneration white spruce. On every 10th quadrat a full count of white spruce regeneration was made. The number of productive scarified quadrats disturbed again by logging during the past winter was also noted. The results of this survey are shown in Table 1.

Table 1 shows the beneficial effects of scalping to mineral soil to prepare a receptive seedbed for white spruce regeneration. Sixty per cent of the scalped quadrats were stocked and supported an average of 3,900 1 and 2 year old white spruce seedlings per acre. During the winter of 1964-65 almost 31% or about 1/3 of the area originally scalped for seedbeds in 1962 was redisturbed by logging, and in some instances scraped clear of all vegetation. It is quite reasonable to presume that a much higher percentage of the area originally scalped might have been stocked with white spruce seedlings had this disturbance not occurred.

PLANTING 1965

In 1965, 6,000 white spruce, 500 jack pine and 250 red pine were planted in the research area: 2,800 white spruce and 500 jack pine were planted on a 6-acre plot along the north boundary of compartment 8. These trees were set out on bulldozed strips in a scattered hardwood stand and form a part of the planting project MS-226.

Approximately 3,000 white spruce were planted in the southeast corner of compartment 6. This site had been logged the previous year, and the seedlings were planted in skid trails, log yards, and along planting strips which had been prepared earlier on in the spring.

About 250 red pine and 200 white spruce were planted this year to restock test plantations in sec. 13 and sec. 1, twp. 20, rge. 19, WPM.

Planting was started on May 17 and was completed on May 25. The work was carried out by two-man crews, one man opening slits with a draining spade and the other planting. The 2 x 2 planting stock was purchased from the Manitoba Forest Service at $20.00 per 1,000 trees. Rate of planting on open patches and bulldozed strips averaged 450 trees per man day. Weather and moisture conditions were favourable for the establishment of plantations and observations during mid-August indicated nearly 100% initial survival of this years plantations.

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2 Consists of areas not able to support white spruce, e.g., sloughs and alder swales.

TABLE 1

WHITE SPRUCE REGENERATION IN 1965 ON AREA SCALPED IN 1962

Line No.	No. of quadrats examined	No. of quadrats scarified	No. of quadrats not scarified	No. of quadrats not productive	No. of scalped quadrats stocked with regeneration	No. of scalped quadrats disturbed by logging	No. of quadrats planted	Stocked with advance growth	No. of quadrats scalped and not stocked	Av. no. of w.s. seedlings per mil-acre
1	200	57	143	-	11	38	15	48	23	3.3
2	230	164	44	22	60	56		20	3	3.0
3	330	202	126	2	99	66		41		3.5
4	210	152	58	-	125	21		-		4.1
5	380	148	128	104	125	25		18		5.5
6	320	133	176	11	94	60		35		4.4
Totals	1670	856	675	139	514	266	15	162	26	3.9

LOGGING

Timber sales are held in the research area to salvage overmature, mature, dying and defective white spruce and hardwoods of merchantable quality on areas selected for regeneration.

In August 1965, an estimated volume of 635,000 f.b.m. of white spruce was marked for shelterwood logging on 360 acres in the west half of compartment II. The cost of marking, scaling, and supervision of timber sales in the research area has been estimated at less than $1.00 per M. f.b.m. By April 1, 1966, approximately 520,000 f.b.m. of white spruce had been removed under the terms of Timber Sale Number 65-1. Stumpage value of the removed timber was $8,350.00.

THINNING AND RELEASING

The thinning and releasing program initiated in 1961 to release white spruce from overtopping hardwoods and thin to a six foot spacing was continued along the north boundary of compartment 21. This year an additional 5.5 acres of dense mixedwood were treated, making a total of 133 acres treated in compartments 20, 21, 22, and 26.

The method used was similar to that used in previous years. Large trees were girdled and small trees were felled. Spruce was thinned to a 6 foot spacing and released from overtopping hardwoods. Rate of treatment this year was approximately 1.6 man days per acre.

PRUNING

A stand improvement pruning program initiated in 1963 was continued in September, 1965, and an additional six acres of advance white spruce growth were treated on compartment one.

Most of the advance growth in this area have "wolf-type" crowns , and if left untreated will produce only low quality lumber.

Axe-handle type pruning saws were used for the job, and pruned heights ranged from 4.5 feet in the three inch class to 9 feet in the six inch class. The rule for pruning was to remove not more than 1/3 of the live crown or half the total height. Rate of treatment was approximately 1-3/4 acres per man day. To date, 33 acres of white spruce have been pruned in compartment one.

The trees pruned in 1963 were re-examined this fall; most of the pruning wounds have healed, and the trees appear vigorous and healthy.

CONTROL LINES

In order to accurately locate sample plots and control sivicultural operations in the research area, all section, township, and range lines will be cleared and staked. To date 43-1/2 miles of this system have been completed.

During the 1965 field season another mile of this system was cleared and staked, and an additional two miles of control line were cleared of windfalls and sprayed with herbicide to prevent the re-invasion of aspen, hazel, and alder suckers.

REMEASUREMENT MS-69 PLOTS

The purpose of the MS-69 experiment is to measure regeneration, rate of growth, mortality, and succession throughout the experimental area. As these plots are continually being disturbed by logging, it has been a practice to remeasure all MS-69 plots before and after logging.

During the 1965 field season, 110 MS-69 plots were measured in compartments 3, 6, and 11, prior to or after logging disturbances. The job was carried out by a three-man crew at an approximate rate of 8 plots per day.

HERBICIDE TREATMENT

White spruce seedlings planted on shallow scarification in the research area are soon overtopped by re-invading aspen and hazel suckers, and some control over the heavy shrub growth is beneficial.

Therefore, during the first week in August 190 chains of strip planting in lots 12 and 13, compartment 1, were sprayed with herbicide to arrest re-invading aspen suckers and hazel bushes. One lb. 2,4-D and one lb. 2,4,5-T acid equivalent was applied in 20 gallons of water per acre. This treatment was effective, and towards the end of August a satisfactory top kill and release was obtained.

A small white spruce plantation established on shallow scarification (lot 14) in compartment 2 was sprayed with herbicide during the first week in August to arrest re-invading aspen and hazel sucker growth. A spray mixture of 60 oz. 2,4-D added to 5 gallons of water was applied at the rate of 5 gallons per acre. This treatment was effective and most of the previously overtopped white spruce were released.

1964 AERIAL HERBICIDE TREATMENT ASSESSMENT

In 1964, 280 acres on the west side of compartment 3 (sec. 6, twp. 21, rge. 18 WPM) were sprayed with herbicide to kill unwanted hardwoods and shrubs. A year later, in August 1965, the sprayed area was examined in an effort to estimate how effective the aerial spraying had been.

Twenty-eight 1/10 acre rate-of-growth sample plots spaced at 10 chain intervals were examined throughout the sprayed area. The amount of individual top kill to each tree species was estimated and recorded by injury class (Table 2). The effects of herbicide spray to hazel brush, aspen suckers and other shrubs was estimated and recorded on two mil-acre quadrats mechanically located in each plot (Table 3).

In spruce-aspen stands, the aerial application of herbicides has proven to be a fast, efficient and economical way of killing unwanted broad leaf trees and shrubs, and reducing the annual leaf fall over large areas for operational silvicultural purposes.

About 88% of the t. aspen and 50% of the scattered white birch were severely top killed (Figure 1). The amount of herbicide applied per acre had very little effect on balsam poplar, and less than 8% of these trees showed any appreciable herbicide damage. Hazel and sapling-size trembling aspen were also severely top killed (Figure 2). A light re-invasion of t. aspen and hazel sprouts was noticed during the last two weeks of August, 1965. Little or no herbicide damage occurred to wild rose, raspberry, Ribes spp., and balsam poplar saplings.

One of the main disadvantages of spraying herbicide in spruce-aspen stands is that it must be timed precisely and can only be done successfully during a short period of the growing season. Care must be taken not to apply the herbicide to spruce or other conifers before the current years foliage has hardened off sufficiently, or too late in the season, as the leaves on deciduous trees become less susceptible to herbicides.

TABLE 2

EFFECT OF 2,4-D AERIAL SPRAY ON DECIDUOUS TREES 1965

Injury class (per cent reduction of living crown)	Percentage of trees examined			
	Trembling aspen	Balsam poplar	White birch	All
0 - 20	3	44	15	11
21 - 40	5	26	20	9
41 - 60	4	22	15	8
61 - 80	15	8	25	14
81 - 100	73	0	25	58
Number of trees examined	246	54	20	320

TABLE 3

EFFECT OF 2,4-D AERIAL SPRAY ON SHRUBS

Species	Average number of stems per acre	
	Killed by spray	living
Hazel	22,800	0
Trembling aspen	2,640	0
Balsam poplar	35	500
Ribes spp.	35	804
Raspberry	0	4,464
Rose	142	4,107

Figure 1. Showing severe top kill to aspen.

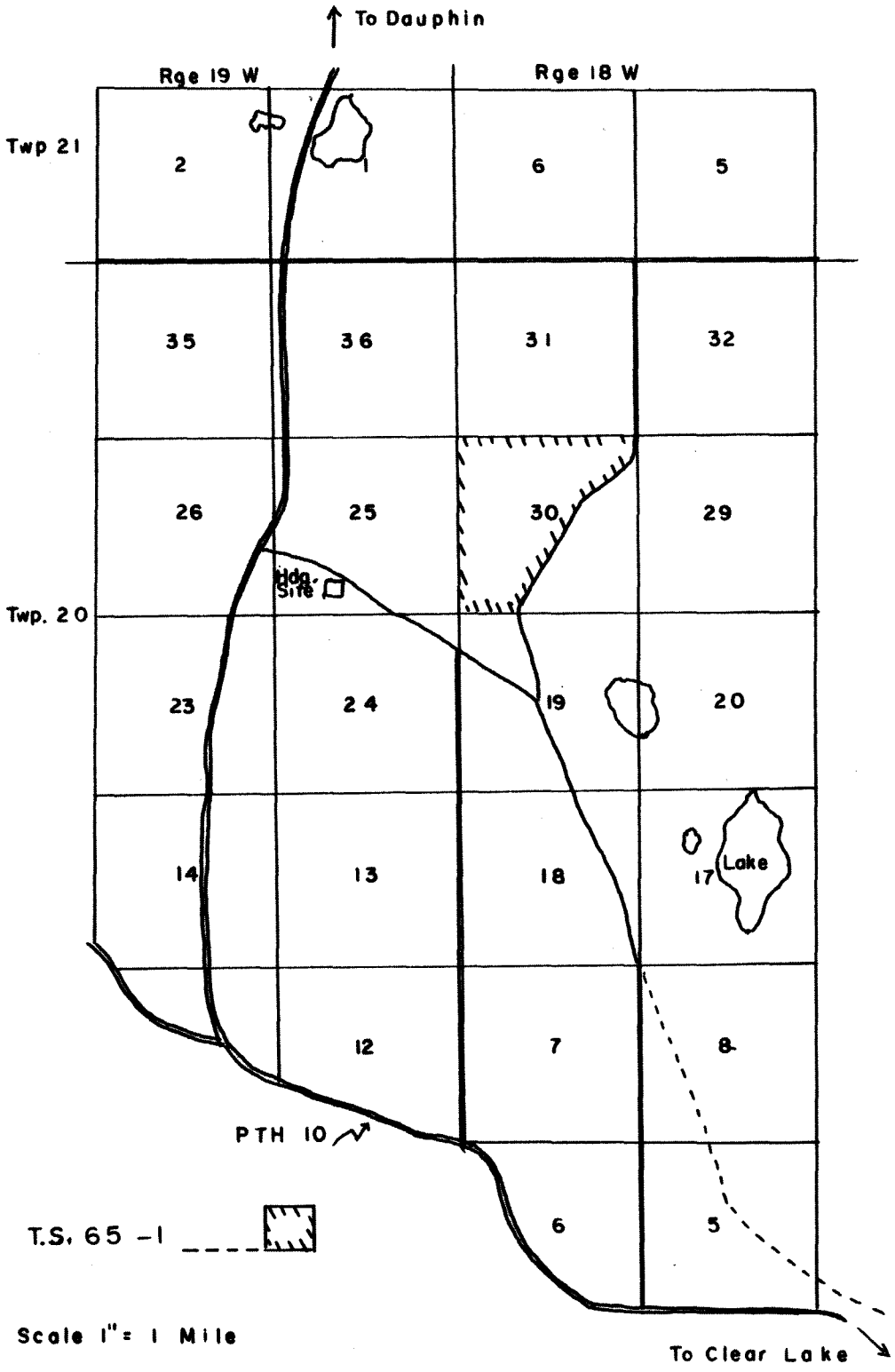
Figure 2. Showing severe top kill to hazel bushes and small shrubs.

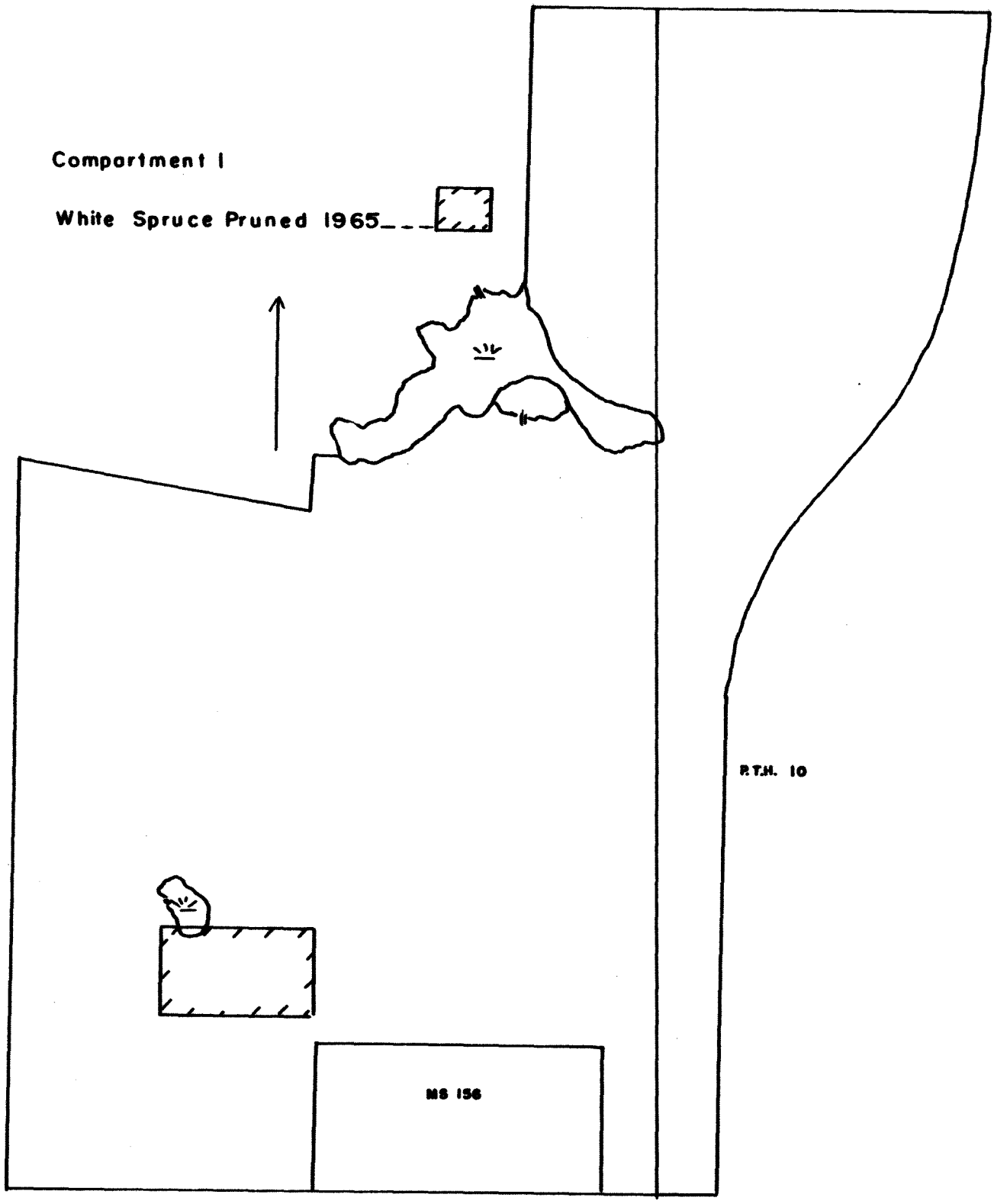
GENERAL

The following table lists projects in the research area for which some assistance was provided during the 1965 field season.

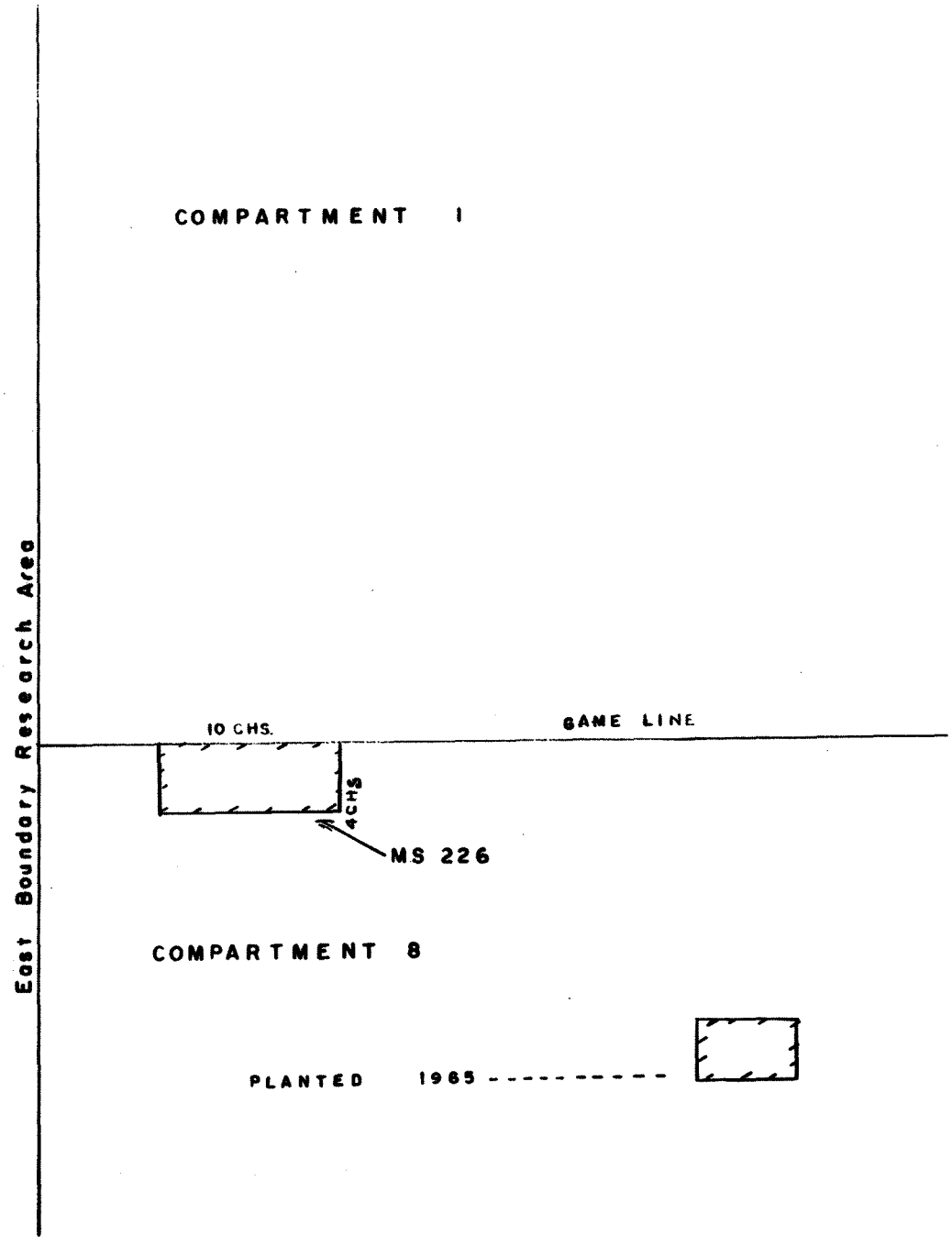
Project number	Type of work	Man days
MS-187	Releasing white spruce seedlings	10
MS-234	Releasing Norway spruce seedlings	16
MS_226 MS-229 MS-510	Planting area fenced to keep out animals	21
Land clearing	Lay-out and supervision land clearing project for aspen silviculture	3
Clonal identification study	For G. A. Steneker	5
Road construction	Approximately 3 miles of access road improved and completed this year (supervision)	6

RIDING MOUNTAIN FOREST EXPERIMENTAL AREA



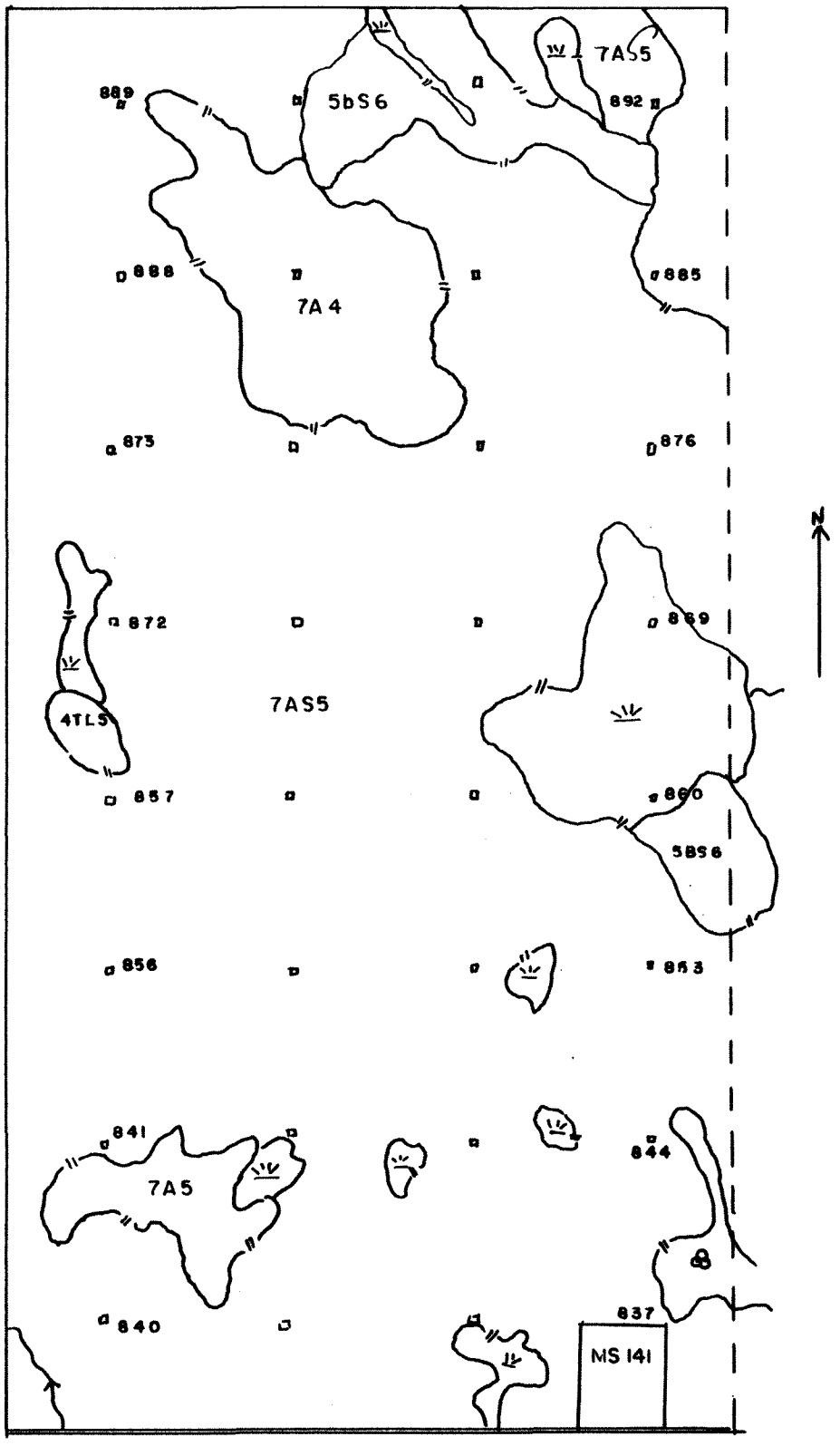

Compartment I
White Spruce Pruned 1965
P.T.H. 10
MS 156

COMPARTMENT 6


COMPARTMENT 1
East Boundary Research Area
10 CHS.
GAME LINE
4CHS
MS 226
COMPARTMENT 8
PLANTED 1965

SPRAYED BY AIR *1964*

COMPARTMENT 3 (W.HALF)



SCALE 1" = 10 CHAINS
M.S. 69 PLOTS - - - - ◻