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Enhancing and Protecting Natural White Spruce Regeneration in Mixedwoods

Location:

Working Circle:	Marlboro
Compartment:	14
Cutblock(s):	89

Overview:

The study differs slightly from the original proposal. Originally, the intent was to have a White Spruce Shelterwood trial and an Understory Protection trial on the exact same landbase. Field practicality necessitated a change of that plan to doing them separately, but on the same cutblock. A clearcut area will also be left for comparative purpose. The DAWP will be updated for the 1994/95 fiscal year showing the mentioned changes.

A report prepared by Brace Forest Services (attached) details the proposed layout of the entire block. It also outlines future plans for the block.

Requests:

The block was scheduled in the 1994 AOP. Upon field laid-out of the research trial sections, Foothills Forest requested (through Weldwood's area coordinator, Ken Groat), an extension to the west of the original block boundary.

We request that you identify this block as research and note that discussions regarding reforestation goals (standards) will have to be discussed.

We are also requesting all in-block roads be allowed to remain for 10 years to facilitate monitoring of experimental site as well as to accommodate expected tours to the area.

**BLOCK LAYOUT AND OPERATIONAL STRATEGIES FOR
PROTECTING IMMATURE SPRUCE DURING AND AFTER
MIXEDWOOD HARVESTING**

Part of:

Understory Protection Treatment Component of the
Foothills Forest Project entitled
"Enhancing and Protecting
Natural White Spruce Regeneration
in Mixedwoods"

November 17, 1993

Prepared for:

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by

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Introduction

The Detailed Activity Work Plan (DAWP) for this project provides a statement of overall purpose, goals and objectives - essentially to adapt shelterwood silvicultural practices to deciduous/coniferous mixedwoods to enhance and protect natural white spruce regeneration. The project site is Block 89, Marlboro Working Circle 14. There are three treatments:

1. Shelterwood for natural regeneration - primarily R and D
2. Conventional clearcut - primarily demonstration
3. Harvesting with protection of immature white spruce - primarily demonstration

Detailed harvesting and post-harvest R and D plans have been developed for Treatment 1 above in the DAWP (Hayward and Navratil).

Demonstration treatment 2 is to follow conventional clearcut harvesting and reforestation practices for the Weldwood Hinton FMA.

Demonstration treatment 3 is the primary focus of this contract report, with particular emphasis on field layout of wind buffers, in-block roads and landings, and machine corridors. Wind buffer width and orientation is of particular importance to the post-harvest stability of immature spruce residuals on this site due to the exposed location and the history of high winds varying from SW to NW.

1. Objectives

The DAWP provides overall objectives for the project, with particular detail for Treatment 1. Treatment 2 is a conventional company operation. Treatment 3 objectives are of primary interest in this report. They include objectives 5, 6 and 7 of the DAWP, paraphrased and enhanced below following discussions with B. Rugg and R. Hayward and on-site inspection.

1. demonstrate benefits of wind buffers for stabilizing immature white spruce residuals following overstory removal in mixedwoods
2. demonstrate the adaptation of modern mechanized harvesting systems to the protection of immature white spruce during initiation of an extensive uniform shelterwood system
3. demonstrate the role of immature spruce residuals in mixedwood stand stocking, structure and growth and yield
4. demonstrate wildlife (ungulate) and aesthetics benefits of immature spruce protection during mixedwood harvest

3. Treatment Sequence and Data Acquisition

The following operational sequence for Treatment 3 (T_0 = time of harvest or year 0) was developed in discussion with B. Rugg and R. Hayward and enhanced following on-site work. Operations are aimed at achieving 60% conifer stocking (including post-harvest spruce residuals). Previous experience suggests to me that a 40% target could probably be achieved without additional regeneration effort

in such stands if a higher deciduous regeneration content were acceptable

- T0 - first pass, removing all merchantable deciduous and lodgepole pine, leaving immature white spruce <20 cm dbh
- T1 - walk-through survey followed by spot scarification with a hoe-mounted unit, to encourage natural spruce regeneration. This will include landings and machine corridors as necessary to meet stocking targets
- T2 - obtain photos (LSP @ 1:5000 preferred) to assess initial post-harvest wind damage
- T3 - space over-dense immature residual spruce clumps to 800/ha maximum
- T5 - repeat LSP for final wind damage appraisal
- T7 - conduct Establishment Survey for stocking and develop crop plan
- T8 - brush and/or plant to meet stocking target
- T10 - second pass, removing wind buffers and some larger seed trees and salvaging mortality
- T14 - conduct Performance Survey
- T25 - conduct FTG survey, determine rotation length and proportion coniferous/deciduous, and enter into growing stock for AAC purposes

Data acquired during pre-harvest surveys and during by post-harvest operational surveys and photo interpretation should be adequate for developing demonstration materials. The compilation of pre-harvest

data should be done in a way which will help operators to visual the size, amount and species of timber expected with each pass in all treatments in Block 89.

4. Field Layout

Field layout is shown in Figure 1. It included activities on the entire block to verify external block boundaries and move where necessary, to establish in-block roads and landings, and to buffer treatment 1 on the north.

On Treatment 1, roads and landings were laid out on the entire east and west sides to accommodate the development of east-west skid trails (machine corridors) and eliminate the use of seismic lines as roads within the treatment. Machine corridors should be laid out after stand marking is complete, and can be varied to accommodate seed tree residuals. A spacing of 30 m is recommended as a balance between amount of trail and length of line pull for choker setters (max 15 m).

On Treatment 2, the strip just north of Treatment 1 is much narrower than originally mapped and could be incorporated into the buffer on Treatment 1, then removed on the second pass in the area, either as part of Block 89 or an adjacent block.

Treatment 3 required most of the layout time, and included location and ribboning of wind buffers, landings and machine corridors in

areas 3(a) and 3(b). Ribbon colors were as follows:

30 m wind buffers	- blue
Machine corridors and in-block roads	- pink
Exterior block boundary	- orange

The 30 m wind buffers in Treatment 3 are oriented north-south. They alternate with 60 m strips designated for first pass removal, within which machine corridors are ribboned at 15 m in 3(a) and 20 m in 3(b). The 15 m spacing should facilitate feller-buncher removal of all merchantable material between corridors without moving off the corridor. The 20 m spacing may require some travel off the corridor by the feller-buncher, especially for large trees. The narrower corridor spacing should minimize spruce root and lower stem damage, but requires a higher percentage of strip removal for corridors.

During the first pass of Treatment 3 it will be necessary to avoid cutting the buffers during felling of landings and corridors. They must be left intact down to the road edge to minimize wind damage along the road.

5. Operational Strategies

a) General

- i) soil/site impacts due to harvesting should be minimized if work is done during freeze-up
- ii) always minimize spruce root and root-cutter damage on all

trees left as residuals to ensure maximum post-harvest wind stability and minimum root rot development

- iii) crown shearing and stem breakage of immature spruce will increase as temperatures go below -20 degrees C and will be greater if hand-felling is employed (Treatment 1)
- iv) always maintain the integrity of wind buffers; do not develop skid trails through them

b) Treatment 1

Most operational details for Treatment 1 are covered in the DAWP.

Additional considerations and observations include:

- i) employ hand-felling and line skidding if possible as this is preferred by scientists conducting R and D
- ii) establish 30 m machine corridors after initial stand marking
- iii) use a hoe-mounted scarifier to achieve maximum flexibility in scarification operations
- iv) adapt regeneration R and D to the existing amount and distribution of immature spruce - including regeneration, limiting removal of post-harvest spruce stocking as much as possible
- v) it is unclear in the DAWP how many entries (passes) will be required to establish an extensive shelterwood system. This should be addressed in future document review.

c) Treatment 2

Conventional clearcutting and regeneration operations are anticipated, using a feller-buncher/grapple skidder system.

d) Treatment 3

See section 3 - treatment sequencing - earlier in this report.

Additional considerations include:

- i) use a feller-buncher/grapple skidder system, presumably the same as in Treatment 2
- ii) pre-fell and skid landings and machine corridors in both 3(a) and 3(b), maintaining wind buffers right down to the road edge
- iii) keep machine corridors to widths of 6 m or less
- iv) harvest areas between machine corridors from the back of the area to the landing, keeping the feller-buncher in the machine corridor as much as possible. Thatch the trees down in the corridor or in adjacent openings, keeping them at a shallow angle to skidding direction to minimize skidding damage. Clean up and utilize damaged (especially leaning) residual spruce as the operation progresses
- v) confine skidder strictly to the machine corridors
- vi) leave rub-stumps along machine corridors in areas of dense spruce and where turning is necessary, to minimize skidding damage to immature spruce residuals
- vii) consider limbing large-crowned deciduous and coniferous trees before skidding, to minimize damage to immature spruce residuals

6. Demonstration Strategy

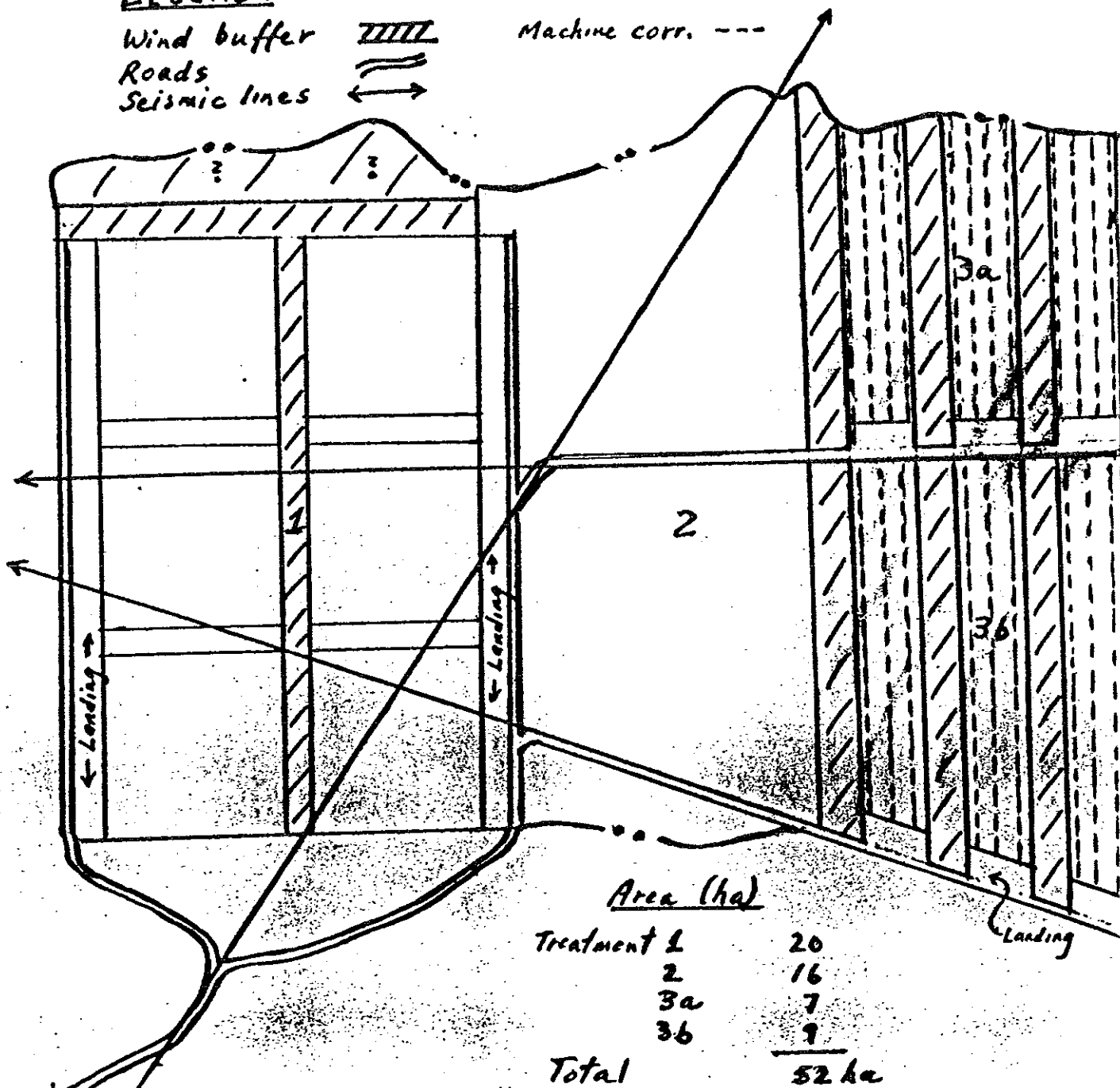
A demonstration strategy for Block 89 should be integrated into the Model Forest demonstration plan. Acquisition of data for demonstration purposes is covered in Section 3 of this report.

COMPART: Mar Moro 14
SCALE : 1:5000
BLOCK #: 89

BLOCK 89

3b. Harvesting mixedwoods - " " " " - 20 m trail

Seismic lines \longleftrightarrow



Pre-harvest Treatments of Aspen for Reducing Brushing Expenditures

Location:

Working Circle: Berland

Compartment: 26

Cutblock(s): 86, 107, 87, 88, 91, 92, 96

Overview:

The purpose of this project is to assess the operational feasibility, biological efficacy and cost/benefits of 2 different types of pre-harvest treatments of aspen, manual-mechanical girdling, and single-tree herbicide injections (the herbicide trial is dependent upon receiving appropriate permit).

Requests:

The following changes were requested for us by Morris Archibald, Area Coordinator Weldwood, in a letter dated October 22, 1993 to Dave Beck, Forester, Hinton Ranger Station.

Block 86 - The block to be expanded to the west by approximately 4 ha. This block was originally in 1994 AOP as a summer cut. The majority of the block will remain a summer cut, with the proposed addition being cut between October 1994 and March 1995)

Block 776- The proposal is to cut the area shown between October 1995 and March 1996 as a first pass block #107

The following blocks were previously girdled and are an integral part of the project but are already planned and require no changes:

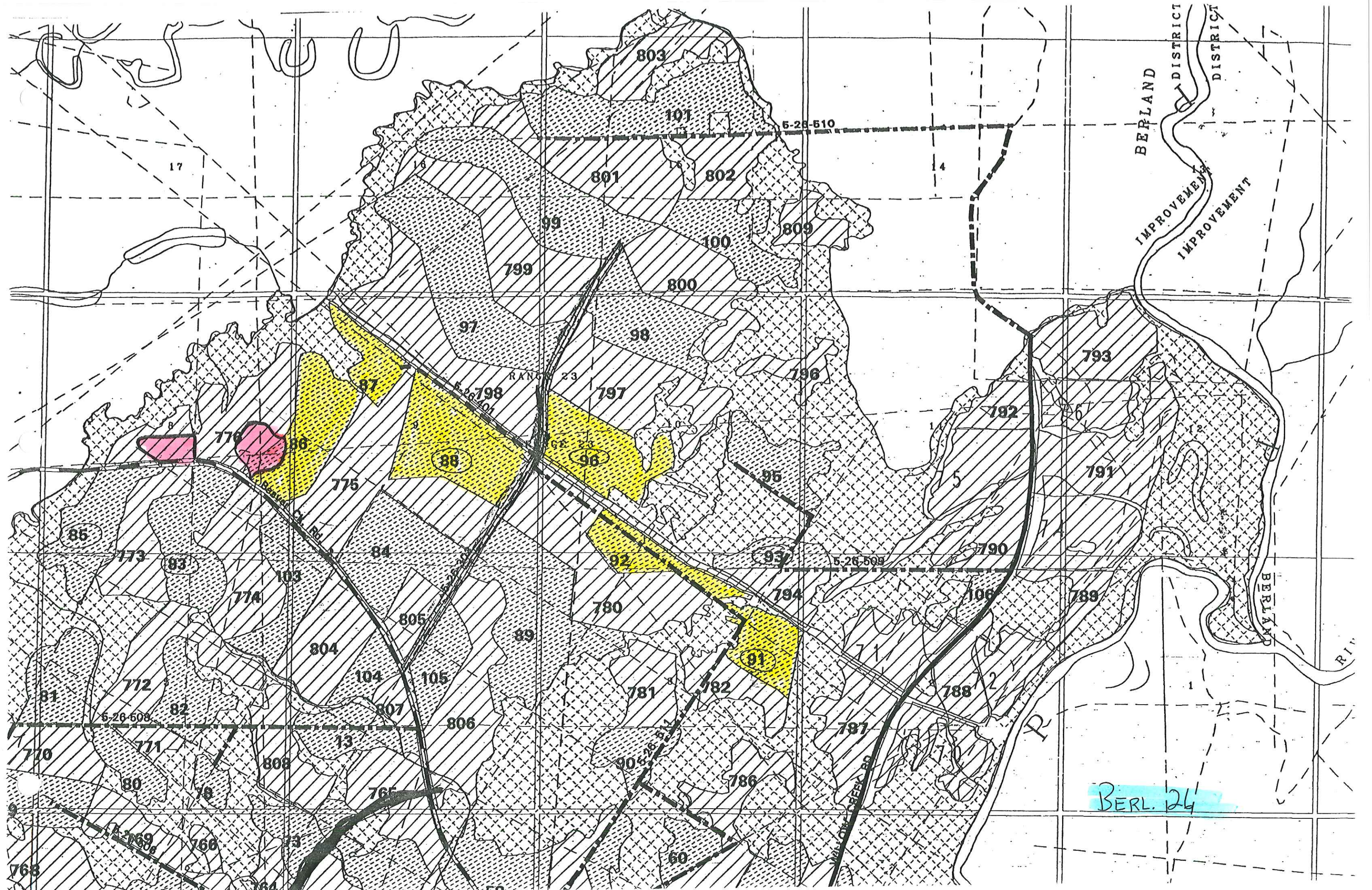
Block 87 - scheduled to be harvested summer 1994

Block 88 - already harvested.

Block 91 - Scheduled to be harvested winter 1993/1994

Block 92 - Scheduled to be harvested winter 1993/1994

Block 96 - Scheduled to be harvested summer 1994



Silvicultural Impacts of Chipper Residue Disposal

Location:

Working Circle: McLeod

Compartment: 17

Cutblock(s): 38

Overview:

The objective of the study is to assess the effects of chipper residue on the ability of cutblocks to meet stand and forest level regeneration objectives. Specifically, it is to assess the impacts of chipper residue on short-term tree establishment and growth as well as long-term site productivity.

The block was originally scheduled to be harvested in the summer 1993 but is now planned to be harvested in December, 1993.

Requests:

We are requesting that in-block roads be allowed to remain for 10 years to facilitate monitoring of crop trees and soil sampling as well as to accommodate expected tours.

We request that you separate the experimental section of this block as research and note that discussions regarding reforestation goals (standards) will have to be discussed. The experimental section will be well identified.

COMMENTS :

LOCATION OF PLOTS FOR CHIPPER RESIDUE
STUDY

COMPART:

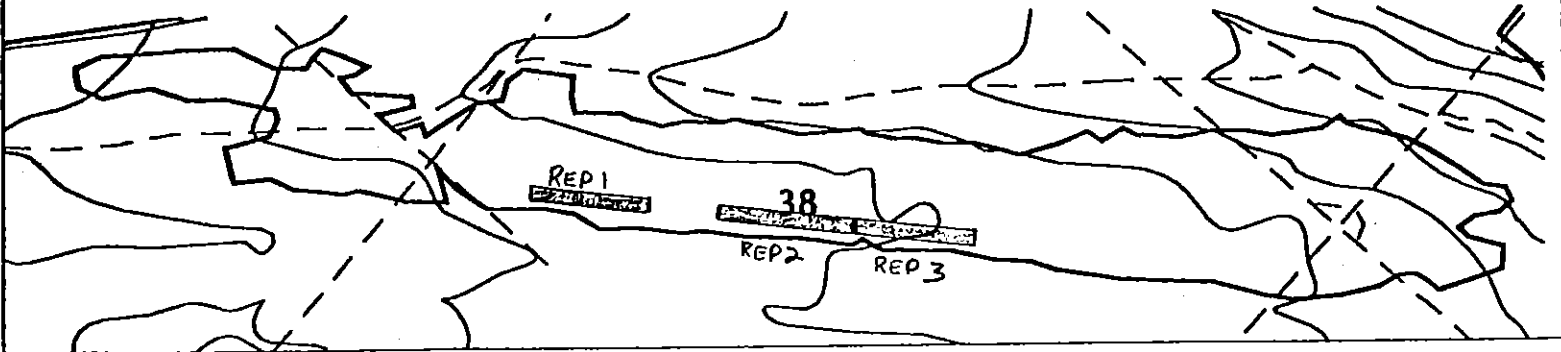
mcl17

SCALE 1:

12500

BLOCKNO:

38

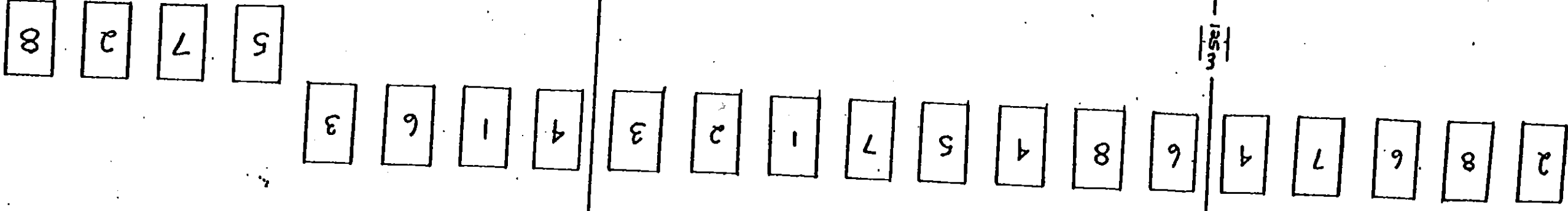




1

REP 2

REP 3



TREATMENTS

- 1 - Control
- 2 - Residue depth 1-5 cm
- 3 - Residue depth 1-5 cm plus fertilizer
- 4 - Residue depth 6-10 cm
- 5 - Residue depth 1-5 cm plus fertilizer
- 6 - Residue depth 10-15 cm
- 7 - Residue depth 1-5 cm plus fertilizer
- 8 - Fertilizer only

LAYOUT

- Replicate 1 - 1, 3, 5, 2, 8, 6, 7, 4
- Replicate 2 - 6, 8, 4, 5, 7, 1, 2, 3
- Replicate 3 - 4, 1, 6, 3, 5, 7, 2, 8

Aspen Regrowth and Competition After Release of Conifers

Location:

The trial is taking place in 3 separate places referred to as Trial A, B, and C.

Trial A: Shining Bank
 Edson Forest
 TWP 57 Rge 14 W5M

Trial B: Working Circle: Marlboro
 Compartment: 17
 Cutblock(s): 631s

Trial C: Yet to be chosen. Will notify on selection.

Overview:

The main purpose of the project is to determine the best timing and cutting technique that would reduce aspen regrowth and competition after release. There is also a planned comparison of the biological efficacy of manual-mechanical and chemical release methods (the herbicide trial is dependent upon receiving appropriate permit).

Requests:

Trial C will be on Weldwood's FMA. Authority may be required.

2000

UNIT BLOCK AND SILVICULTURE STATUS REPORT

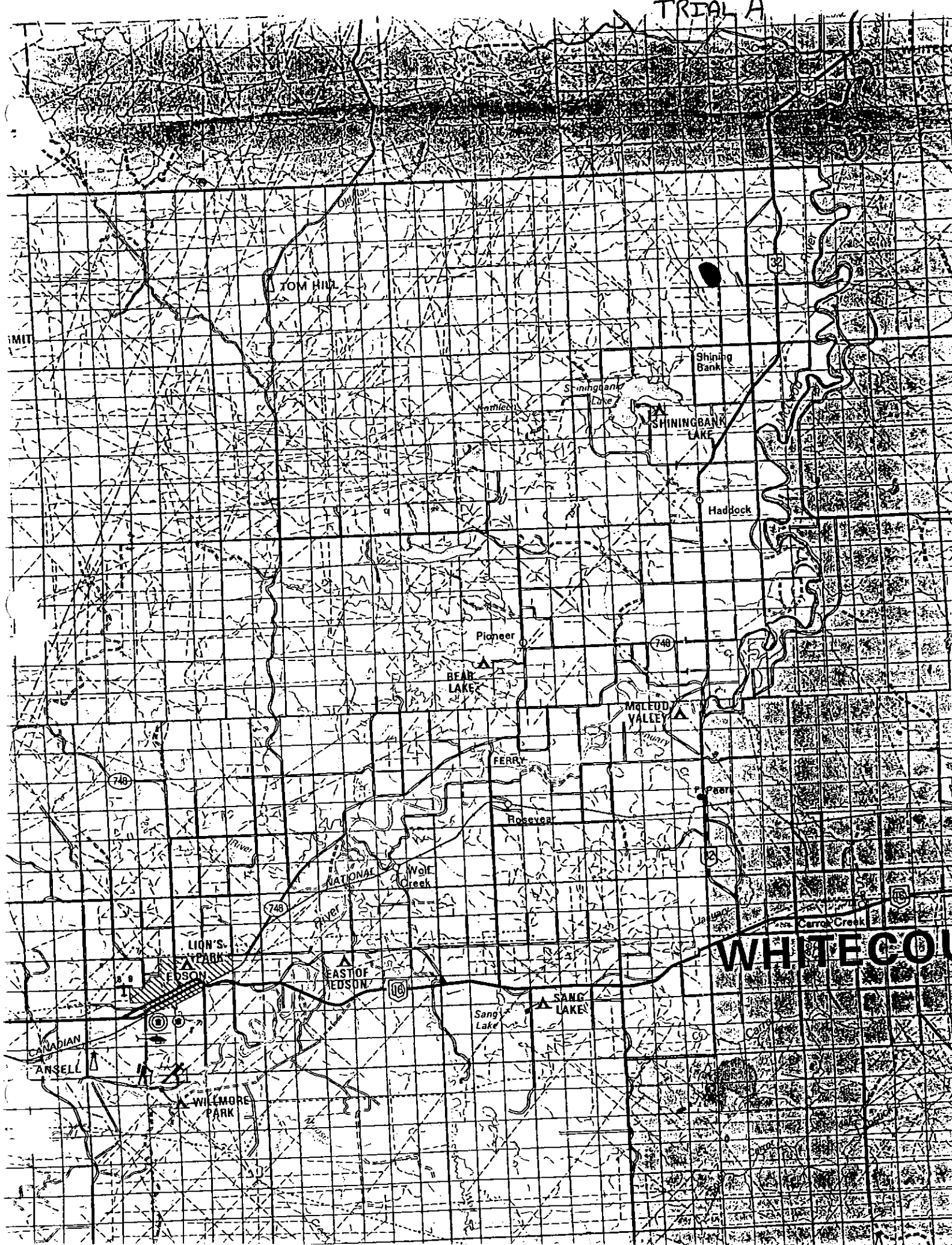
1. ADMINISTRATIVE INFORMATION

4. SURVEY INFORMATION

5. TREATMENT INFORMATION

TRIAL A

TRIAL A



WHITE COUL

TRIAL A

DTPE 51001

DTPE 5

84
C3A-H
89-M
A1A-U
93-M

55
C3A-H
89-M

83
B3A(6-M)-H
89-M
B1A-U
93-M

80
A3A-U
90-G
C1A-U
95-G

18
53-G

78
A3A-U
90-G
C1A-U
95-G

CLG

132

19
14-G

131

55
C3A-H
89-M

CLG

CLG

60
D3A-H
89-G

CLG

73
A3A-U
90-G
C1A-U
95-G

CLG

62
D1A-U
95-G

63
A3A-U
89-M
C1A-U
95-G

55
C3A-H
89-M

69
C3A-H
89-M

67
C1A-U
95-G

66
A3A-H
89-M
C1A-U
95-G

65
C3A-H
90-G

64
B3A-H
89-M

72
B3A-H
89-M
B1A-U
95-G

CLG

71
A3A-H
90-G
C3A-U
96-M

70
CLG

18
C3A-H
90-G

19
D3A-U
89-M



17

COMPARTMENT

MARLBORO

TRIAL B

Validation of Basal Diameter Ratio Competition Index for Pine-Aspen

Location:

Working Circle: Marlboro

Compartment: 8

Cutblock(s): 404, 378, 378A

Overview:

A study has been established in these cutblocks, harvested in 1985 and 1986, to test how effective the Basal Diameter Competition Index, developed by Forestry Canada, is in guiding stand tending decisions in lodgepole pine / aspen cutblocks.

All baseline data has been collected, and the experimental blocks have been released to the desired levels.

Requests:

Nil

Compartment History

WORKING CIRCLE MARLBORO

COMPARTMENT 8

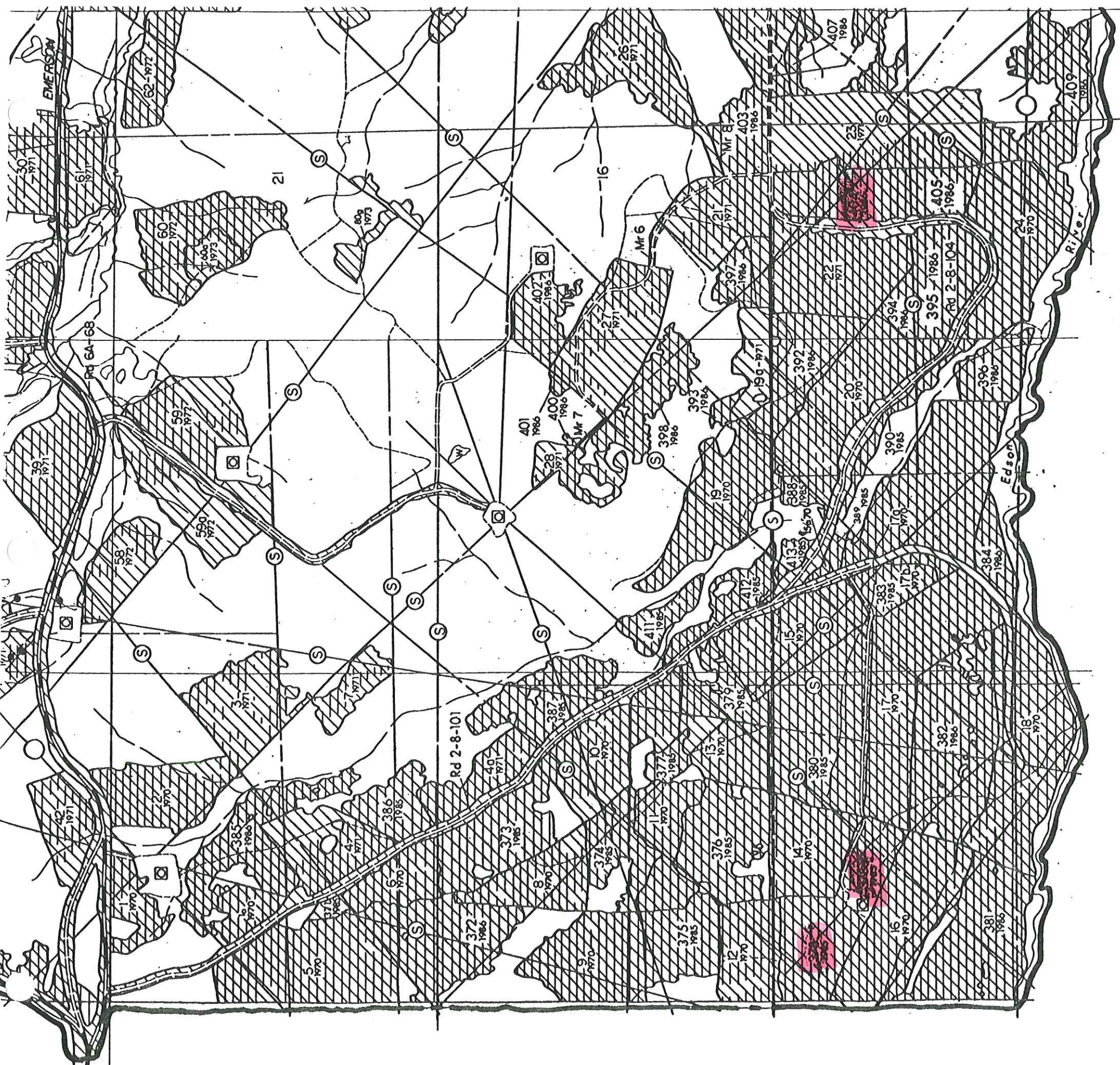
- OPEN MUSKEG
- TREED MUSKEG
- BRUSHLAND
- GRASSLAND
- OPENING
- HEIGHT OF LAND
- WATER
- RIVER

- CONTINUOUS CREEK
- INTERMITTENT CREEK
- BRIDGE
- STREAM PROTECTION
- OIL or GAS WELLSITE
- BUILDINGS
- LOOKOUT TOWER

- PROVINC
- MAJOR
- ALL-WE
- MARGIN
- RAILWAY
- TRAIL
- SEISMIC



MOST RECENT AERIAL PHC
UPDATED TO CUTOVER PH

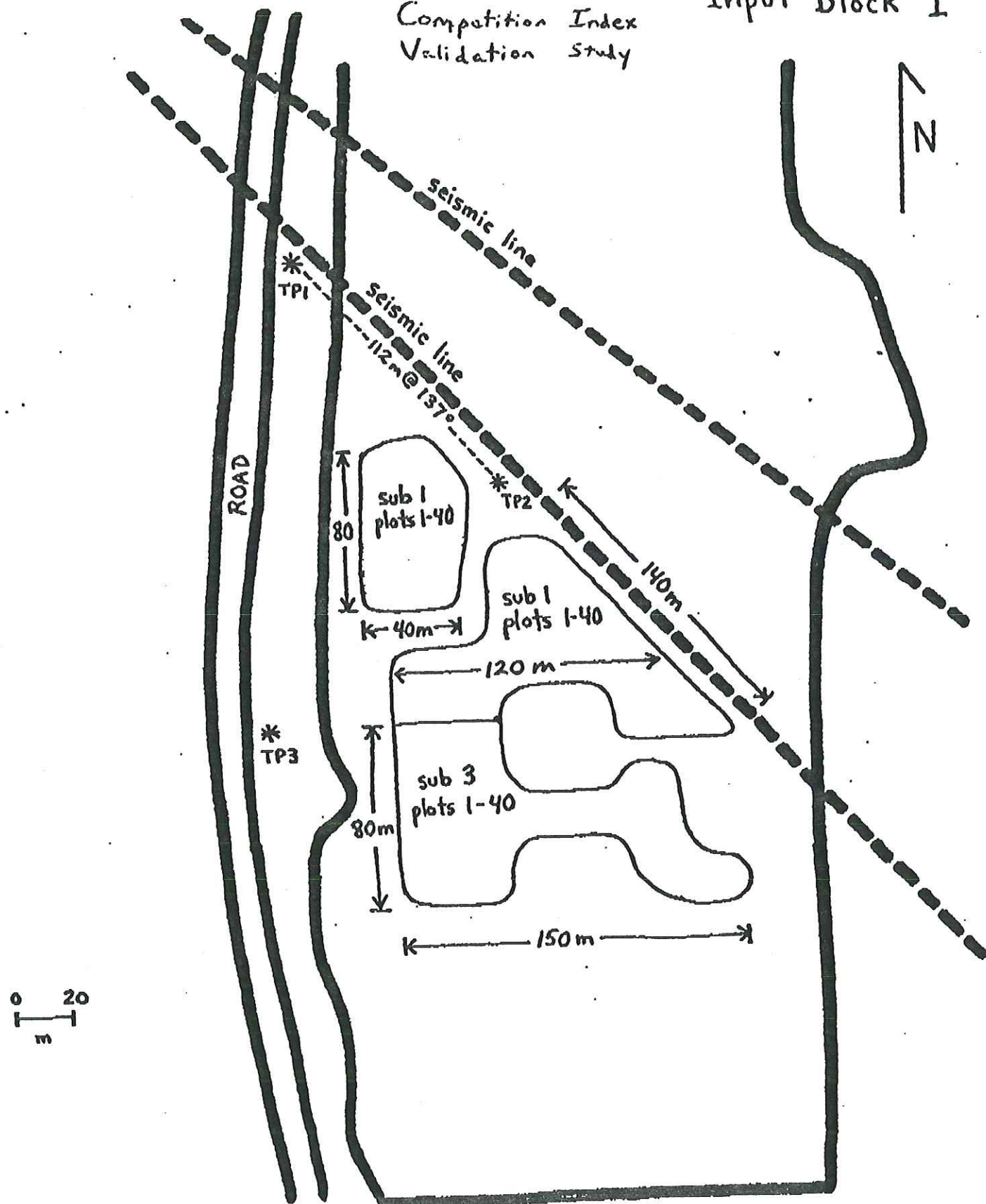


Marlboro Working Circle

Compartment 8

Block # 404
Input Block 1

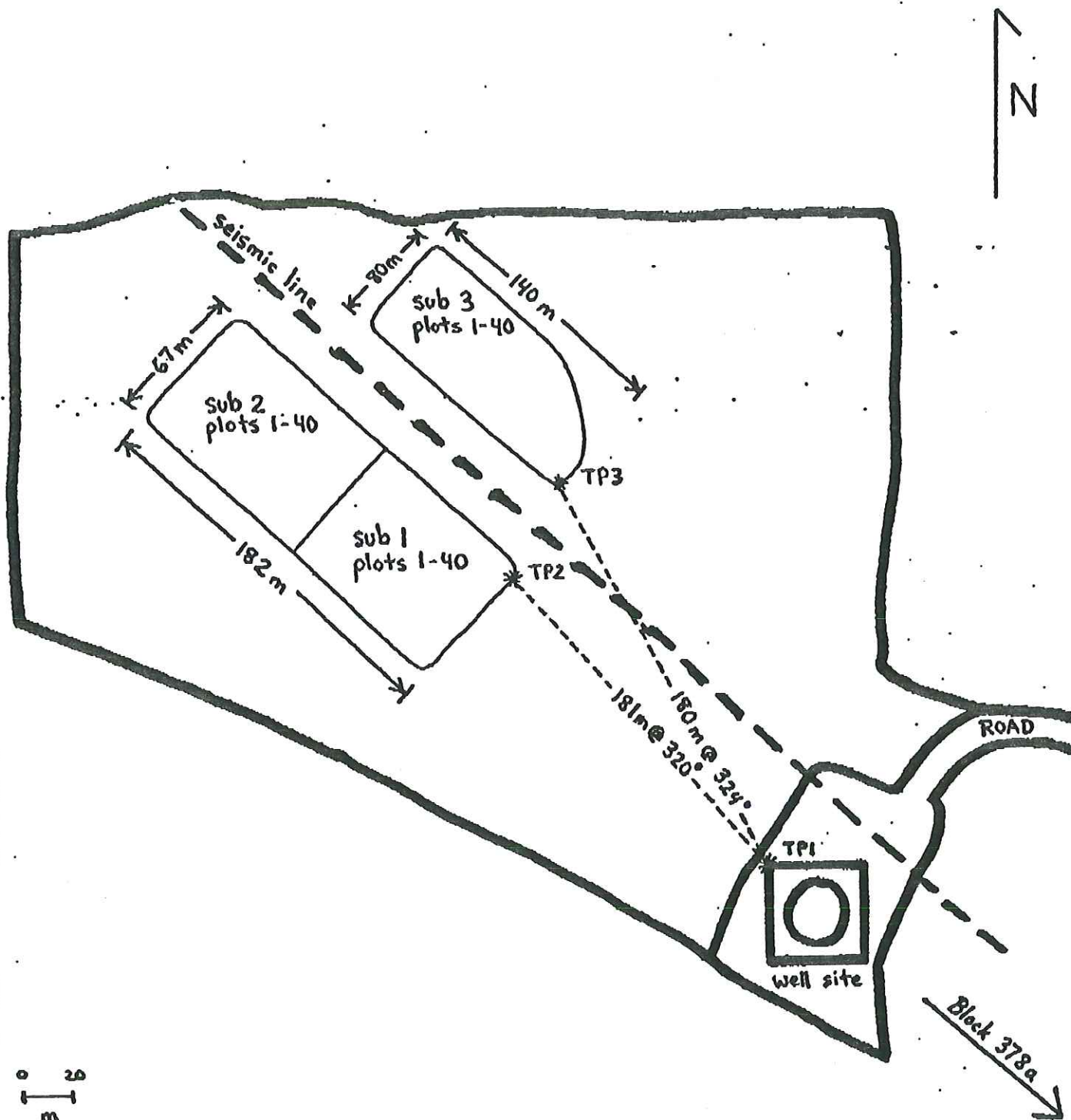
Computation Index
Validation Study



*Note: Tiepoints are marked with painted and flagged $\frac{1}{2}$ " metal conduit

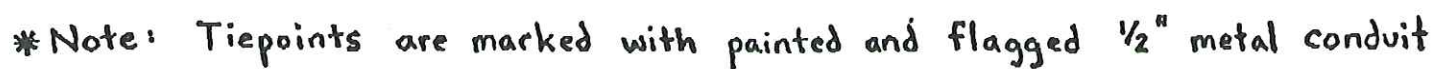
Marlboro Working Circle Compartment 8
Competition Index Validation Study

Block # 378
Input Block 2



*Note: Tiepoints are marked with painted and flagged $\frac{1}{2}$ " metal conduit

Block # 378 a
Input Block 3



Environmental Impacts of Forestry Practices on Boreal Mixedwood Ecosystems

Location:

Working Circle: Marlboro
Compartment: 8
Cutblock(s): 526, 535

Overview:

The research project will be investigating the impact of selected forestry practices (organic matter removal and compaction) on short- and long-term site productivity, and composition and structure of plant communities.

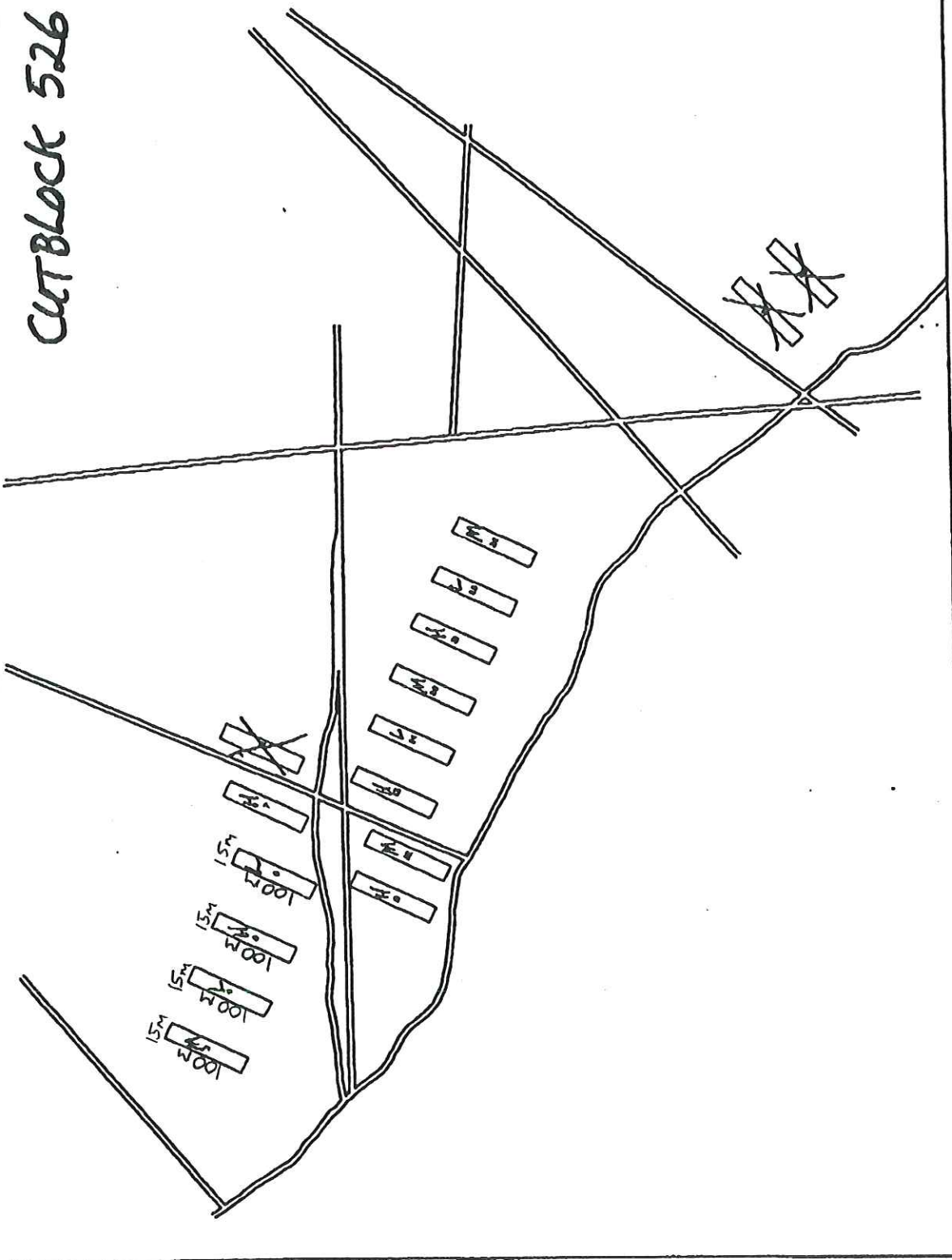
Both cutblocks were harvested this summer/autumn.

Requests:

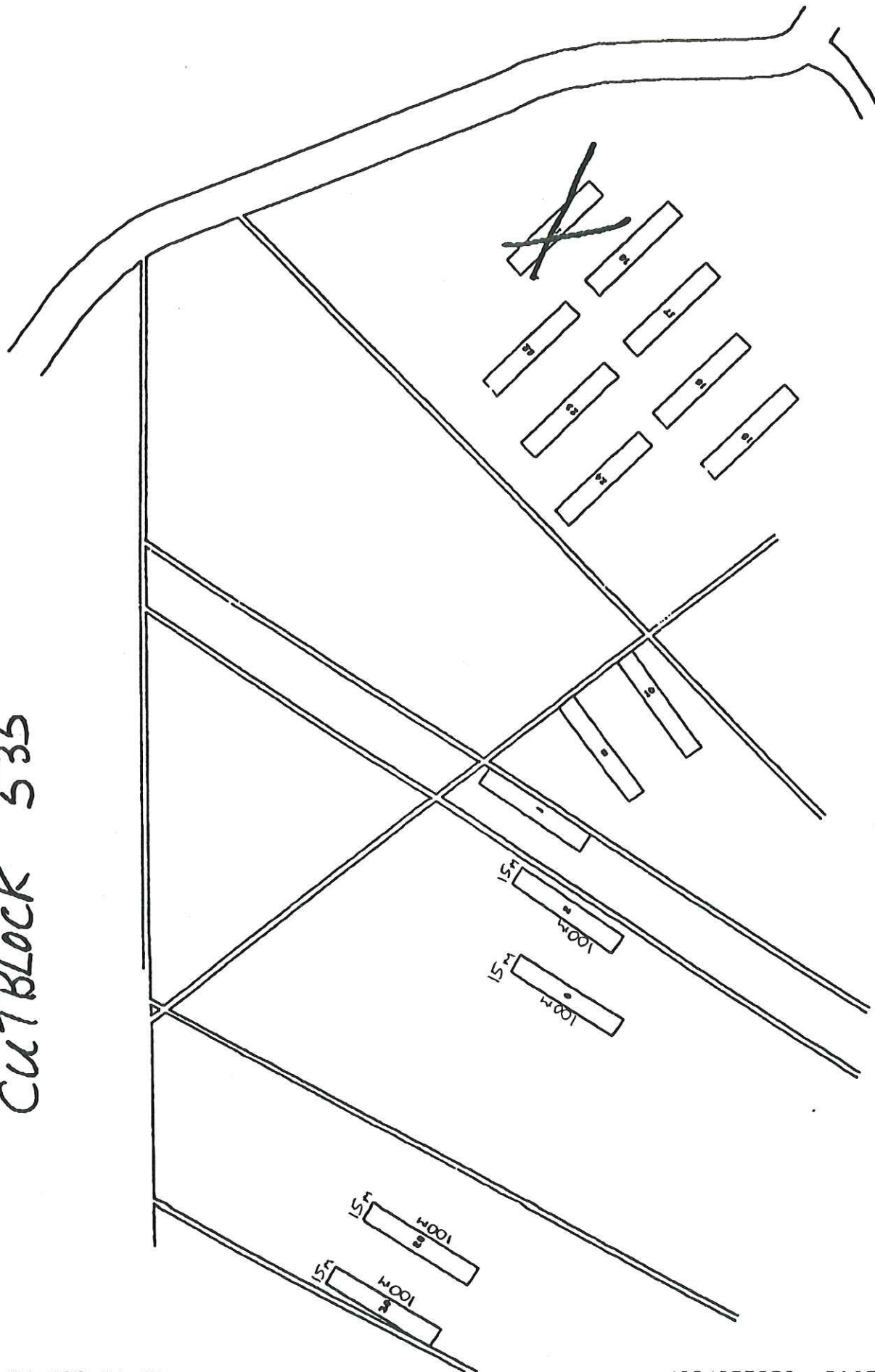
We request that you identify this block as research and note that discussions regarding reforestation goals (standards) will have to be discussed. Mechanical site preparation **must be avoided**.



Cut Block 526



CutBlock 535



McLeod Demonstration Area

Location:

Working Circle: McLeod

Compartment: 20

Cutblock(s): 300

Compartment: 5

Cutblock(s):

Overview:

The basic intent of this project is to develop a silvicultural system that will maintain forest cover for wildlife benefit while at the same time ensure successful regeneration, mainly natural.

Differing levels of crown closure will be assessed for the effects on the above mentioned objectives.

This project is still in the planning stage and has not been officially approved by the Foothills Forest Board of Directors.

Requests:

Conceptual approval of harvesting plan (for this portion of compartment only) so that detailed plans can be made.

Once final approval is granted we will then request that you identify this block as research and note that discussions regarding reforestation goals (standards) will have to be discussed.