

PESTICIDE USE
IN BRITISH COLUMBIA FORESTRY
1981

by

P. Humphreys
Protection Branch

British Columbia Ministry of Forests
Victoria, British Columbia
Forest Service Internal Report
PM-PB-8

Not for Publication

(The contents of this report may not be cited in whole or part without the written approval of the Director, Protection Branch, Ministry of Forests, 1450 Government Street, Victoria, B.C. V8W 3E7)

TABLE OF CONTENTS

TABLE OF CONTENTS	ii
LIST OF FIGURES AND TABLES	iii
ABSTRACT	iv
INTRODUCTION	1
METHOD	3
RESULTS.	7
DISCUSSIONS AND CONCLUSIONS.	23
ACKNOWLEDGEMENTS	24
APPENDICES	25

LIST OF TABLES AND FIGURES

		Page
Table I	Example of B.C. Ministry of Forests 1981 Pesticide Use Follow-up form.	6
Table II	The Fate of 1981 Pesticide Use Permits Issued by the B.C. Pesticide Control Branch, Ministry of Environment.	9
Table III	The Fate of Appealed 1981 Pesticide Use Permits as Determined by the B.C. Environmental Appeal Board.	9
Table IV	Summary of Pesticide Use, 1981.	10
Table V	Herbicide Use by Control Purpose, 1981.	13
Table VI	Insecticide and Other Pesticide Use by Control Purpose, 1981.	14
Table VII	Areas Treated by Forest Inventory Type Identity, 1981.	16
Table VIII	Comparison of Areas Scheduled for Pesticide Treatment with Areas Actually Treated, 1981.	19
Figure 1	Parameters of Electronic Word Processing Permit Data File.	4
Figure 2	Example of Electronic Word Processing File Extraction.	5
Figure 3	Percent Pesticide Use by Area Treated, 1981.	11
Figure 4	Percent Pesticide Use by Weight, 1981.	12
Figure 5	Comparative Summary of the Purpose of Pesticide Use by Area Treated, 1981.	15
Figure 6	Percent Area of Forest Inventory Type Identity Treated with Pesticides, B.C. Ministry of Forests, 1981	17
Figure 6A	Percent Area of Forest Inventory Type Identity Treated with Pesticides, B.C. Forest Industry, 1981	18
Figure 7	Comparison of Area Scheduled for Pesticide Treatments with Area Actually Treated, 1981	20
Figure 8	Reasons for Pesticide Use Permit Cancellations by Area Affected, 1981	21
Figure 9	Total Hectares of Land Treated with Herbicides for Forestry Purposes, 1975-1981.	22

ABSTRACT

As a result of improved methods of filing and retrieving forestry pesticide use permit data, a 1981 forestry pesticide use report has been prepared. Follow-up information included in this report represents 90 percent of all pesticide use permits issued to the B.C. Ministry of Forests and B.C. forest industry for the period 1981. Included are figures and tables demonstrating amounts of each pesticide used, and areas treated by user, control purpose, forest type identity and other parameters. Pesticide use permits cancelled in 1981 and areas affected by such cancellations, as well as herbicide use trends from 1975 - 1981 are also represented.

INTRODUCTION

Summarized in this report are the results of a survey conducted during 1982 on pesticide use in 1981 by the British Columbia Ministry of Forests and B.C. forest industry.

Information presented here is part of an ongoing effort to provide accurate records of pesticide use in British Columbia forest and rangeland. It is hoped that such data, summarized on an annual basis, will be a useful asset in forecasting future trends and establishing current needs.

Data concerning the processing of 1981 applications include numbers of permits issued, cancelled and appealed. Decisions of the Environmental Appeal Board on all appealed permits are also indicated.

Data concerned with actual pesticide use, resulting from permits issued in 1981, are broken down into the following categories:

- (1) by user - e.g. B.C. Ministry of Forests, B.C. Forest Industry or a combination of both;
- (2) by particular pesticide used - e.g. 2,4-D amine, fosamine (Krenite);
- (3) by type of pesticide used - e.g., herbicide, insecticide;
- (4) by control purpose - e.g. conifer release, site preparation, insect control;
- (5) by project type - e.g. research or operational;
- (6) by forest stand type identity - e.g. mature, immature, not sufficiently restocked and;
- (7) by hectares of forest land treated and kilograms of pesticide (active ingredient) used.

Many projects scheduled for 1981 were cancelled because of current economic problems and other factors. The quantitative impact of such permit cancellations is demonstrated by a table summarizing hectares of land scheduled for pesticide treatment in 1981 versus hectares actually treated. Two graphs related to permit cancellations are also included - one to compare areas scheduled for pesticide treatment with areas actually treated, and one to show some of the reasons for permit cancellations by areas affected.

In addition to the above, a graph is presented to illustrate the general trend of forestry herbicide use since 1975.

The following appendices are included: A 1981-1982 Inventory indicating pesticide purchase, use and storage by the Ministry of Forests and; a graphical comparison of areas treated by controlled burning, mechanical brushing and herbicides by the Ministry of Forests, 1981-1982 fiscal year.¹

¹ Figures for controlled burning and mechanical brushing are taken from the Ministry of Forest's Annual Report 1981-82 fiscal year. Figures for herbicide use are taken from this report.

METHOD

Permit and follow-up information contained in this report came from the following main sources, all of which were either established or improved during 1981 and 1982:

(1) The B.C. Ministry of Environment, Pesticide Control Branch, has recorded all pesticide use permits issued since 1980 and stores the information in an electronic word-processing file. This storage system, established largely as a cooperative effort between the Pesticide Control Branch and the Ministry of Forests, Protection Branch, stores 27 parameters on each pesticide permit (Figure 1). The word processing equipment is capable of extractions by one or several parameters (Figure 2).

(2) The Ministry of Forests' Silviculture Branch maintains Silviculture Stand Tending Reports. Revised as a result of input from Protection Branch, these reports now serve as a source of follow-up data on all operational silviculture projects involving pesticide use.

(3) The Ministry of Forests' Protection Branch maintains follow-up records, resulting from the survey of 1981 pesticide use. Revised follow-up forms (Table I) were sent to managers in the Ministry of Forests and forest industry, who were able to route them directly to the project supervisors involved. Each 1981 permit shown in the Pesticide Control Branch electronic word processing file was listed on a follow-up form. Pertinent information was recorded on each form to assist project supervisors in cross referencing their records with the specific pesticide use permit involved.

FIGURE 1 PARAMETERS OF ELECTRONIC WORD PROCESSING PERMIT DATA FILE

Col # Column Information

1. Permit Number:
Includes - Co. name/Agency code
- Sequential Number
- Years of Project
- Special Status
2. Permit Holder
3. Type of Control - General:
P = Plant Control
I = Insect Control
F = Fungus Control
V = Vertebrate Control
O = Other
4. Type of Control - Specific:
Plant Control
10 = Conifer Release
20 = Brush Control
30 = Grass Control
40 = Right-of-way Maint.
50 = Pre-Commercial Thinning
60 = Noxious Weed Control
70 = Site Preparation
80 = Seed Tree Control
90 = Dwarf Mistletoe Control
Insect Control
10 = Bark Beetles and Weevils
20 = Defoliators
30 = Cone and Seed Insects
Fungus Control
10 = Root and Butt Rots
20 = Heart and Sap Rots
30 = Rusts and Needle Blights
40 = Moulds
Vertebrate Control
10 = Birds
20 = Deer
30 = Predator
40 = Rodents
Other
10 = Moss, Algae, Liverworts
5. Project Description
Ag. Crop Bird Repel.
Ag. Crop Deer Repel.
Ag. Crop Fungus Control
Ag. Crop Insect Control
Aquatic Weed Control
Fish Management

Forest Deer Control
Forest Fungus Control
Forest Insect Control
Forest Nursery
Forest Nursery Weed
Forest Stand Thinning
Forest Weed Control

Ind. Veg. Ditchbank
Ind. Veg. Rail Ballast
Ind. Veg. Rail Brush
Ind. Veg. Road Shoulder
Ind. Veg. Utility Ompd.
Ind. Veg. Utility R of W

Landscape Insect
Landscape Weed

Mosquito Adult Control
Mosquito Larvae Control
Mosquito A & L Control

Noxious Weed Control
Predator Control

Col # Column Information

6. Pest Control Prod. Act Registration No.
7. Common Name: pesticide active ingredient
8. Quaranteed Ingrid. Code: code designation of active ingredient
9. Effective Date of Permit: yr, mo, day
10. Project Start and Finish Dates: dates between which the pesticides use may be conducted.
11. Application Rate: kilograms of active ingredient per hectare
12. Maximum Quantity: kilograms of active ingredient.
13. Method:
G = Ground
01 = Truck mounted spray boom
02 = Backpack sprayer
03 = Mistblower
04 = Powerhose/Nozzle
05 = Hand Broadcast
06 = Hack and Squirt
07 = Granular Spreader
08 = Other
A = Air
01 = Fixed Wing
02 = Helicopter
B = Both Ground and Air
14. Treatment Area: Total hectares which may be treated
15. Forest Region
C = Cariboo N = Nelson
G = Prince George R = Prince Rupert
K = Kamloops V = Vancouver
16. Map Reference: National Topographic System 1:100,000 scale on which the treatment area is located.
17. Ministry of Environment Region:
1 = Vancouver Island 5 = Cariboo
2 = Lower Mainland 6 = Skeena
3 = Thompson - Nicola 7 = Omineca-Peace
4 = Kootenay 8 = Okanagan
18. Nearest town
19. Site Description
20. Land Status:
P = Privately owned
C = Crown Land
B = Private and Crown Land included in treatment area
21. Land Use:
AG = Agriculture RE = Recreational
FO = Forestry RA = Rangeland
PU = Public Utility OO = Other
TC = Transportation Corridor
22. Appeal Deadline: yr, mo, day
23. Number of Appeals
24. Hearing Date: yr, mo, day
25. Appeal Decision:
S = Permit Supported
A = Permit Amended
C = Permit Cancelled
26. Status:
C = Cancelled by Administrator
R = Revoked by Administrator
A = Amended
S = Suspended
27. No. of amendments

FIGURE 2 EXAMPLE OF ELECTRONIC WORD-PROCESSING

FILE EXTRACTION

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	9003	PICLORAM	PIC	80.04.28	80.06.01-80.09.15	1.12	3.36	G05	3.0	G 93	G 93	G 93	7	MCBRIDE	GROUNDHORN RESERVE	C	FO	80.05.09					
B.C.MIN OF FORESTS	P 60	FOREST WEED CONTROL	9003	PICLORAM	PIC	80.04.28	80.06.01-80.09.15	1.1	9.0	G02	8.0	G 93	G 93	G 93	7	MCBRIDE	PR. GEORGE FOR. DIST.	C	FO	80.05.13					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	9003	PICLORAM	PIC	80.04.28	80.06.01-80.09.15	1.1	7.0	G02	6.0	G 93	G 93	G 93	7	MCBRIDE	PR. GEORGE FOR. DIST.	C	FO	80.05.13					
B.C.MIN OF FORESTS	P 70	FOREST STAND THINNING	9528	2,4-D AMINE	KRE	80.06.02	80.08.01-80.10.31	8.0	124.0	G06	17.0	V 92GN	V 92GN	V 92GN	2	SECHLT	CARLSON LAKE-UNIT 21	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.02	80.08.01-80.10.31	8.0	240.0	G02	30.0	V 92GN	V 92GN	V 92GN	2	SECHLT	TZOONIE RIVER AREA	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.02	80.08.01-80.10.31	8.0	470.0	G06	59.0	V 92GN	V 92GN	V 92GN	2	SECHLT	CARLSON CK-UNITS A&B	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.02	80.08.01-80.10.31	8.0	255.0	G06	32.0	V 92GN	V 92GN	V 92GN	2	SECHLT	CARLSON CK-UNITS A&B	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	6.6	5.4	G02	0.9	V 92GN	V 92GN	V 92GN	1	CAMPBELL	WAKEFIELD CK-UNIT ABC	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	6.6	185.0	A02	55.3	V 92HSW	V 92HSW	V 92HSW	2	LAIDLAW	MCBREIGHT LAKE AREA	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	6.6	78.9	A02	26.3	V 92HSW	V 92HSW	V 92HSW	2	LAIDLAW	MCBREIGHT LAKE AREA	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	180.0	G06	40.0	V 92ENE	V 92ENE	V 92ENE	1	ZEBALLOS	HUNTER CREEK AREA	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	27.0	G02	5.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	645.0	G06	143.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	928.0	G02	116.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	360.0	G06	80.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	54.0	G06	12.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	13.0	G06	3.0	V 92FSE	V 92FSE	V 92FSE	1	PORT HARDY	DR. MCLEAN CK. AREA	C	FO	80.05.30					
B.C.MIN OF FORESTS	P 10	FOREST WEED CONTROL	2851	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	4.8	700.0	A02	146.0	V 92FSE	V 92FSE	V 92FSE	2	MISSION	THOMPSON SOUND AREA	C	FO	80.06.13					
B.C.MIN OF FORESTS	P 80	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	18.0	G06	4.0	V 92KNE	V 92KNE	V 92KNE	2	SAYWARD	HEAD OF BUTE INLET	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 80	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	16.0	G02	2.0	V 92KNE	V 92KNE	V 92KNE	2	SAYWARD	HEAD OF BUTE INLET	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 80	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	8.0	G02	1.0	V 92KNE	V 92KNE	V 92KNE	2	SAYWARD	HEAD OF BUTE INLET	C	FO	80.06.17					
B.C.MIN OF FORESTS	P 80	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	18.0	G06	4.0	V 92FSE	V 92FSE	V 92FSE	1	NANAIMO	MT. BENSON-BLK 306	C	FO	80.06.06					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	16.0	G02	2.0	V 92BNW	V 92BNW	V 92BNW	1	NANAIMO	MT. BENSON-BLK 306	C	FO	80.06.06					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	108.0	G02	2.0	V 92BNW	V 92BNW	V 92BNW	1	NANAIMO	MT. BENSON-BLK 306	C	FO	80.06.06					
B.C.MIN OF FORESTS	P 80	FOREST WEED CONTROL	9528	2,4-D AMINE	KRE	80.06.05	80.07.02-80.09.15	16.6	108.0	G06	6.0	V 92BNW	V 92BNW	V 92BNW	1	DUNCAN	CHEMUNUS RIV-BLK 22	C	FO	80.06.27					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	184.0	G02	23.0	V 92ONE	V 92ONE	V 92ONE	1	DUNCAN	HILLCREST RD-BLK 166	C	FO	80.06.20					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	14064	FOSAMINE	KRE	80.06.12	80.08.01-80.10.31	8.0	137.0	A02	28.5	V 92ONE	V 92ONE	V 92ONE	1	SKUTZ FALLS AREA	HILLCREST RD-BLK 166	C	FO	80.06.20					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	16097	FOSAMINE	KRE	80.06.19	80.08.01-80.10.31	4.8	137.0	A02	28.5	V 92ONE	V 92ONE	V 92ONE	1	SKUTZ FALLS AREA	HILLCREST RD-BLK 166	C	FO	80.06.27					
B.C.MIN OF FORESTS	P 20	FOREST WEED CONTROL	16097	FOSAMINE	KRE	80.06.19	80.08.01-80.10.31	4.8	137.0	A02	28.5	V 92ONE	V 92ONE	V 92ONE	1	SKUTZ FALLS AREA	HILLCREST RD-BLK 166	C	FO	80.06.27					

TABLE 1. EXAMPLE OF B.C.
MINISTRY OF FORESTS 1981 PESTICIDE USE FOLLOW-UP FORM

DIVISION OR DISTRICT: _____

	PERMIT INFORMATION	FOLLOW-UP INFORMATION
1. P.C.B. NO.	_____	_____
2. PESTICIDE (COMMON NAME)	_____	_____
3. APPLICATION DATE(S)	_____	_____
4. PROJECT LOCATION (NEAREST TOWN etc.)	_____	_____
5. HECTARES TREATED	_____	_____
6. ACTIVE INGREDIENT USED (kg)	_____	_____
7. COST \$/ha OF TREATMENT ¹	_____	_____
8. FOREST STAND TYPE(S)	_____	_____
9. TYPE IDENTITY ²	_____	_____
10. TARGET SPECIES	_____	_____
11. HEIGHT (M) OF TARGET SPECIES (if applicable)	_____	_____
12. EFFICACY ASSESSMENT DATE	_____	_____
13. EFFICACY COMMENTS OR RATING ³	_____	_____

1. COST (\$/ha)
Estimate should include preparation for treatment, as well as labour, chemical, equipment and supervision costs.
2. TYPE IDENTITY
 - JMM - Immature
 - MAT - Mature
 - RES - Residual
 - NSR - Not satisfactorily restored
 - NC - Non-Commercial
 - NF - Non-Forest
 - DSD - Disturbed, stocking doubtful
 REFERENCE: Province of British Columbia. Ministry of Forests. May 1979. Silviculture Manual. Chapter 4, Appendix 4-6.
3. TREATMENT EFFICACY
Please comment or use the following criteria:
FOR PLANT CONTROL:
 - 1 = Little or no kill
 - 2 = Less than 50% top kill
 - 3 = More than 50% top kill
 - 4 = Killed to ground but resprouting
 - 5 = Dead
 REFERENCE: Dow Chemical Company
Herbicide Efficacy Rating
FOR INSECT OR OTHER TYPES OF CONTROL:
Estimate of % control after specified length of time.

RESULTS

Results of the Ministry of Forests' survey on 1981 forestry pesticide use are presented in detail on the following pages, by a series of graphs and tables.

The accuracy of the information presented, expressed in terms of the number of permits verified by follow-up data, is approximately 90 percent.

Of a total of 185 forestry related permits issued by the B.C. Pesticide Control Branch, only 89 or 48 percent were utilized. Fifty two percent of the remaining permits were either cancelled unofficially by the permit holders involved or cancelled officially at the permit holders' request, by the B.C. Pesticide Control Branch.

A total of eighteen 1981 pesticide use permits were appealed by one or more appellants. Sixteen of these permits were upheld and two were amended as a result of decisions by the Environmental Appeal Board.

The three most commonly applied pesticides in terms of area were fosamine, 2,4-D amine and MSMA (monosodium methane asenate) with, respectively, 2762.2, 1812.3, and 1480.9 hectares treated. The three most commonly used pesticides in terms of weight were fosamine, MSMA and 2,4-D amine with, respectively, 13623.4, 5490.8, and 4347.4 kilograms of active ingredient applied.

Treatment of forest land with herbicides for the purpose of conifer release was the most predominant type of forestry pesticide application. Conifer release accounted for 3636.0 hectares of forest land treated with pesticides, while pre-commercial thinning and brush control together accounted for 1889.7 hectares, or approximately half this amount. The use of

insecticides on 134.5 hectares of forestland reflected mostly research and detection projects. Finally there was a minute amount of thiram (1.5 kilograms on 0.3 hectares) used for the purpose of controlling deer browse.

Immature stands received most of the pesticides applied in 1981. The B.C. Ministry of Forests treated 1339.5 hectares of immature forest stands, while B.C. forest industry treated 3756.9 hectares of immature forest stands. Notably, there were no mature stands treated with pesticides by B.C. forest industry while the B.C. Ministry of Forests treated 382.1 hectares of mature stands. The non-forest category, for the B.C. Ministry of Forests, represents all applications to rangeland.

The impact of pesticide use permit cancellations was dramatic when expressed in terms of hectares affected. The most dominant case involved the use of 2,4-D amine. While 6626.9 hectares were scheduled to be treated with 2,4-D amine in 1981, only 1812.3 hectares were actually treated. Similarly in the case of fosamine only 2762.2 hectares were treated out of a scheduled total of 6638.0 hectares.

Based on those permits for which reasons for cancellation were known, 1793 hectares were not treated because of a lack of pesticide stocks, (this involved fosamine only), 870.8 hectares were not treated because of union disputes, strikes and appeals, and 717.4 hectares were not treated because of project postponements.

Overall area treated with herbicides increased in 1981 from the previous year by approximately 865.0 hectares for the B.C. Ministry of Forests and 642.0 hectares for B.C. forest industry.

TABLE II. THE FATE OF 1981 PESTICIDE USE PERMITS ISSUED
BY THE B.C. PESTICIDE CONTROL BRANCH, MINISTRY OF ENVIRONMENT

	MINISTRY OF FORESTS		FOREST INDUSTRY		TOTAL	
	#	%	#	%	#	%
PERMITS ISSUED (TOTAL)	76	(100%)	109	(100%)	185	(100%)
PERMITS IMPLEMENTED BY HOLDER	43	(57%)	46	(42%)	89	(48%)
PERMITS CANCELLED BY HOLDER	26	(34%)	53	(49%)	79	(43%)
PERMITS CANCELLED BY THE PESTICIDE CONTROL BRANCH	7	(9%)	10	(9%)	17	(9%)

TABLE III. THE FATE OF APPEALED 1981 PESTICIDE USE PERMITS
AS DETERMINED BY THE B.C. ENVIRONMENTAL APPEAL BOARD

	MINISTRY OF FORESTS #	FOREST INDUSTRY #	TOTAL #
PERMITS APPEALED	4	14	18
APPEALED PERMITS CANCELLED	0	0	0
APPEALED PERMITS AMENDED	0	2	2
APPEAL PERMITS SUPPORTED	4	12	16

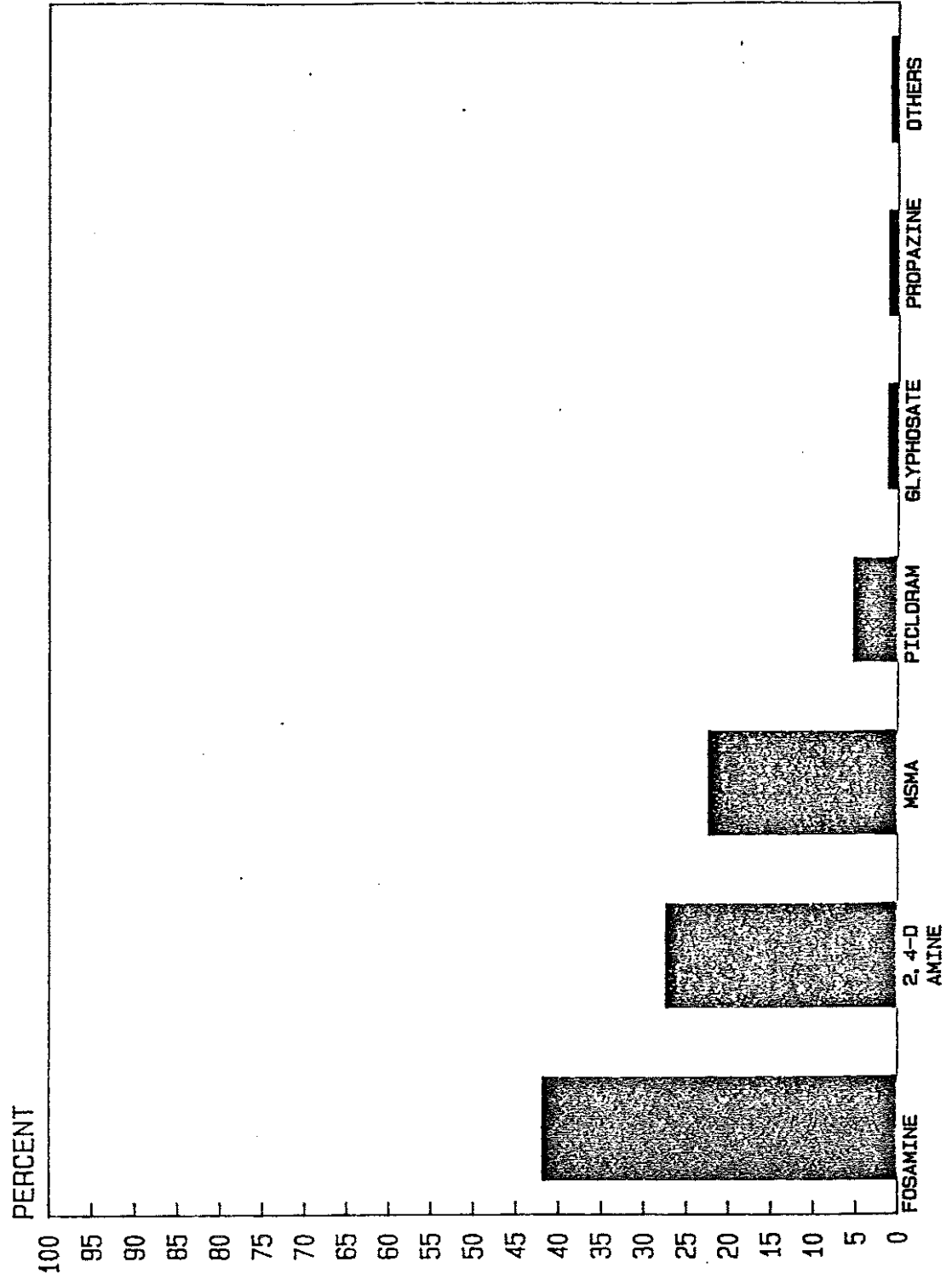
TABLE IV. SUMMARY OF PESTICIDE USE¹
1981

PESTICIDE	MINISTRY OF FORESTS			FOREST INDUSTRY		
	ha treated OP ²	RES ³	kg a.i. OP	ha treated OP	RES	kg a.i. OP
FOSAMINE (Krenite)	1753.4	-	8110.8	999.8	9.0	5493.8
2,4-D AMINE	152.3	-	605.2	1660.0	-	3742.2
MSMA	50.0	58.3	4.9	1372.6	-	5480.0
PICLORAM	351.8	0.1	694.4	-	-	-
GLYPHOSATE	1.0	12.9	10.4	-	62.0	61.5
PROPAZINE	-	69.8	-	-	-	-
BROMACIL	-	0.9	-	20.2	-	147.5
N.P. Virus	-	19.9	-	-	-	-
CHLORPYRIFOS	-	5.0	-	-	-	-
ASULAM	-	2.0	-	-	-	-
HEXAZINONE	-	1.2	-	-	0.6	1.0
CARBARYL	-	1.0	-	-	-	-
PHEROMONE ⁴	-	-	-	-	0.4	0.5
THIRAM	-	-	-	0.2	0.1	0.5
DIMETHOATE	-	0.1	-	-	-	-

¹Data presented includes pesticide treatments applied to rangeland administered by the B.C. Ministry of Forests.
²Operational projects
³Research trials or studies
⁴Special use permit

FIGURE 3. PERCENT PESTICIDE USE BY AREA TREATED 1

1981



1 B.C. MINISTRY OF FORESTS AND B.C. FOREST INDUSTRY COMBINED

FIGURE 4. PERCENT PESTICIDE USE BY WEIGHT 1

1981

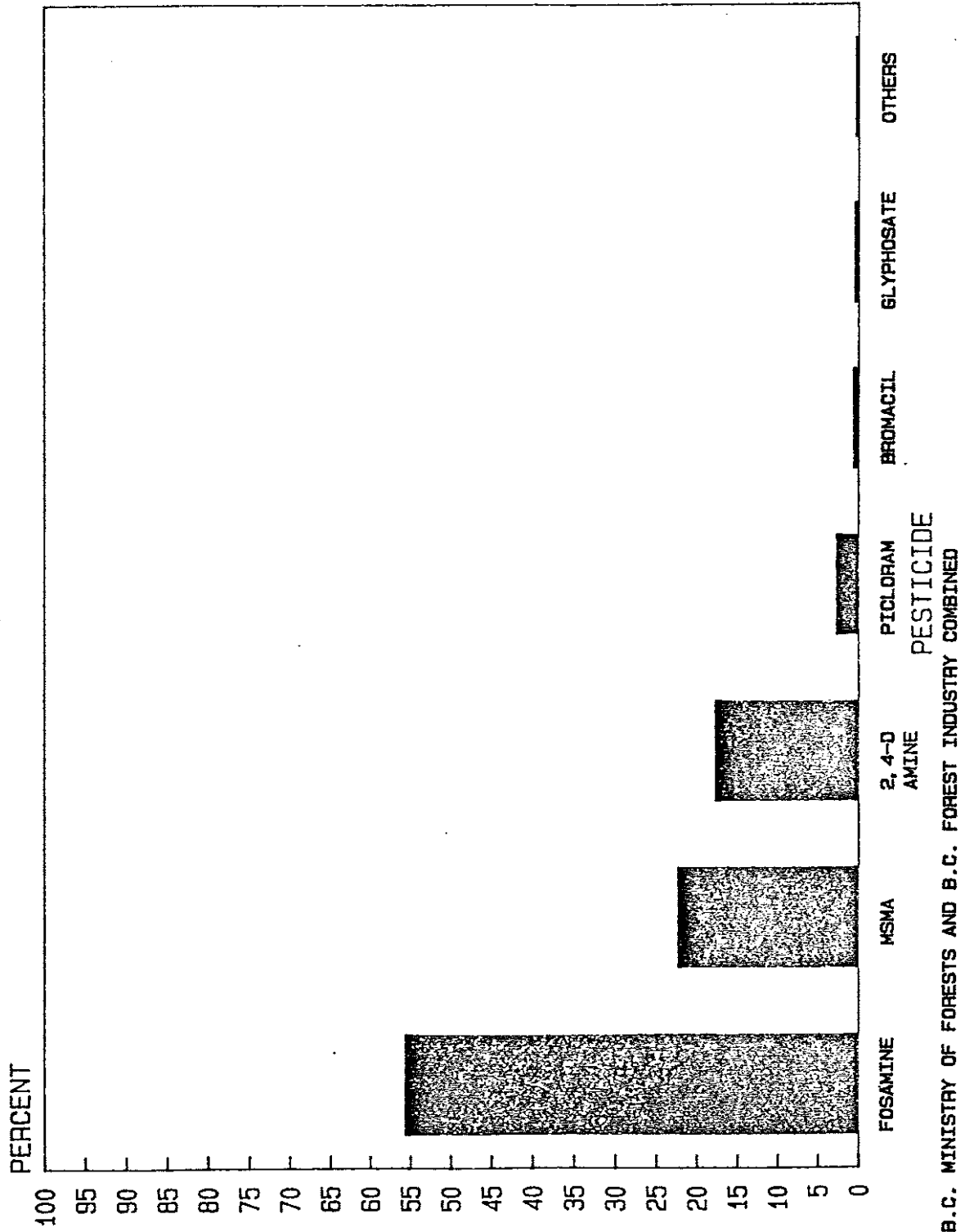


TABLE V. HERBICIDE USE BY CONTROL PURPOSE
1981

PURPOSE	HERBICIDES USED	MINISTRY OF FORESTS ha Treated	kg a.i. used	FOREST INDUSTRY ha Treated	kg a.i. used
CONIFER RELEASE	2,4-D Amine fosamine (Krenite) glyphosate hexazinone asulam	63.3 1753.4 - 1.2 2.0	293.7 8110.8 - 0.8 19.5	798.0 956.1 62.0 - -	1279.4 5223.7 61.5 - -
PRE-COMMERCIAL THINNING	glyphosate MSMA bromacil	1.6 0.2 0.9	1.1 0.3 3.1	- 1372.6 -	- 5480.0 -
BRUSH CONTROL	2,4-D Amine fosamine (Krenite) glyphosate hexazinone	- - 0.3 -	- - 0.6 -	476.0 37.5 - 0.6	450.0 198.0 - 0.9
NOXIOUS WEED CONTROL	picloram glyphosate propazine ¹	351.9 4.3 69.8	694.9 4.3 39.9	- - -	- - -
SITE PREPARATION	2,4-D Amine glyphosate	89.0 7.7	311.5 5.0	- -	- -
RIGHT-OF-WAY MAINTENANCE	2,4-D Amine fosamine (Krenite) bromacil	- - -	- - -	335.0 15.2 20.2	1990.0 90.9 147.5
SEED TREE CONTROL	2,4-D Amine	-	-	51.0	22.9

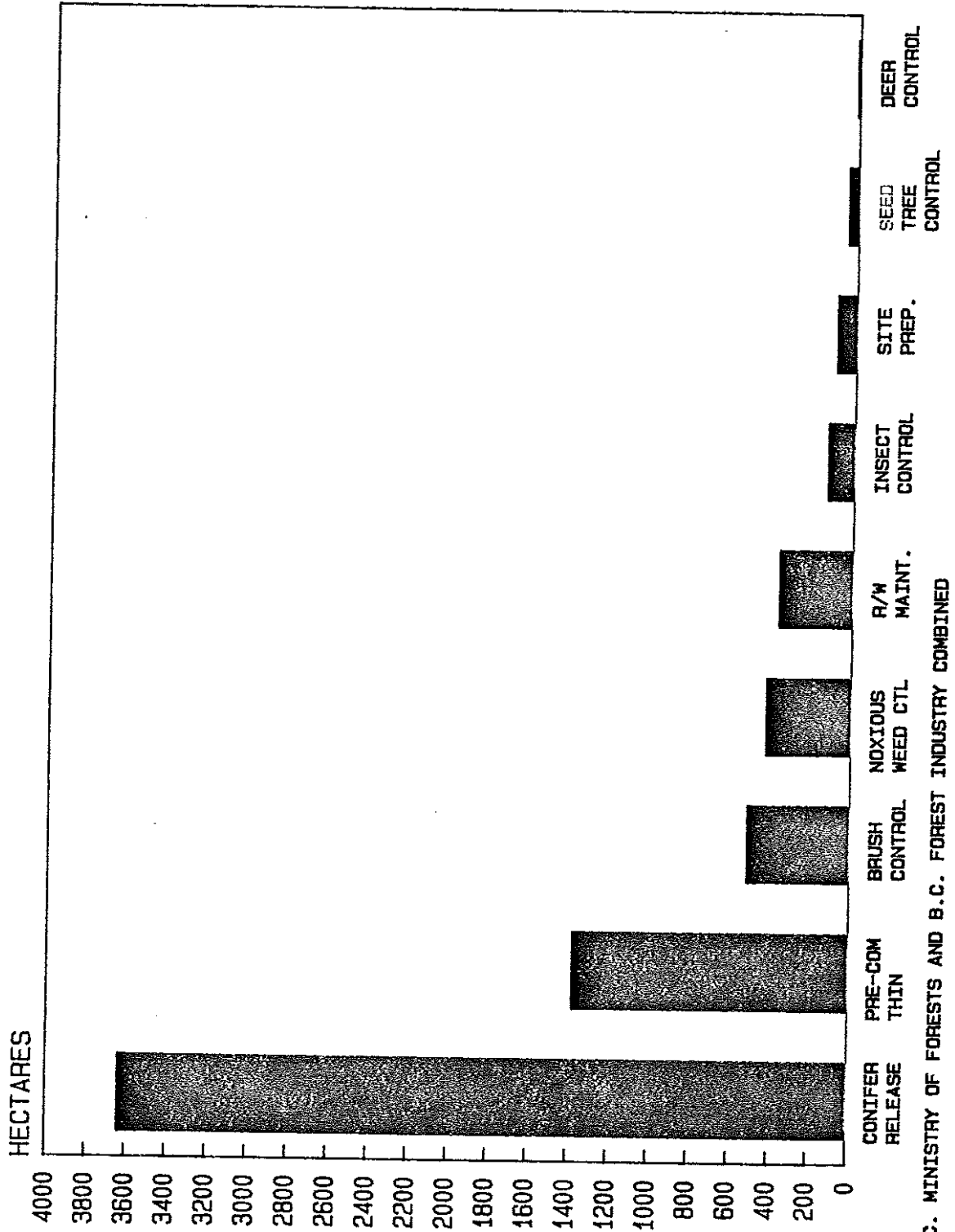
¹ Forest nursery use only

TABLE VI. INSECTICIDES AND OTHER TYPES OF PESTICIDE USE BY CONTROL PURPOSE
1981

PURPOSE	INSECTICIDES, OTHER PESTICIDES ETC. USED	MINISTRY OF FORESTS ha treated	kg a.i. used	FOREST INDUSTRY ha treated	kg a.i. used
INSECT CONTROL	MSMA	108.1	10.4	-	-
	NPV	19.9	1.0	-	-
	dimethoate	0.1	0.01	-	-
	carbaryl	1.0	0.2	-	-
	chlorpyrifos	5.0	6.0	-	-
	pheromone	-	-	0.4	-
14					
DEER CONTROL	thiram	-	-	0.3	1.5

FIGURE 5. COMPARATIVE SUMMARY OF THE PURPOSE OF PESTICIDE USE BY AREA TREATED 1

1981



1 B.C. MINISTRY OF FORESTS AND B.C. FOREST INDUSTRY COMBINED

TABLE VII. AREAS TREATED BY FOREST INVENTORY
TYPE IDENTITY
1981

TYPE IDENTITY ¹	MINISTRY OF FORESTS HECTARES	FOREST INDUSTRY HECTARES
IMMATURE	1339.5	3756.9
MATURE	382.1	-
RESIDUAL	-	-
NOT SATISFACTORILY RESTOCKED	336.5	-
NON-COMMERCIAL	-	338.4 ⁴
NON-FOREST	351.6 ²	20.2 ⁵
DISTURBED, STOCKING DOUBTFUL	-	9.0
NOT APPLICABLE	70.0 ³	0.4 ⁶

¹ Reference: Province of British Columbia, Ministry of Forests, May 1979. Silvicultural Manual. Chapter 4, Appendix 4-6

² Represents all pesticide applications to rangeland

³ Represents all pesticide applications for forest nurseries and seed orchards

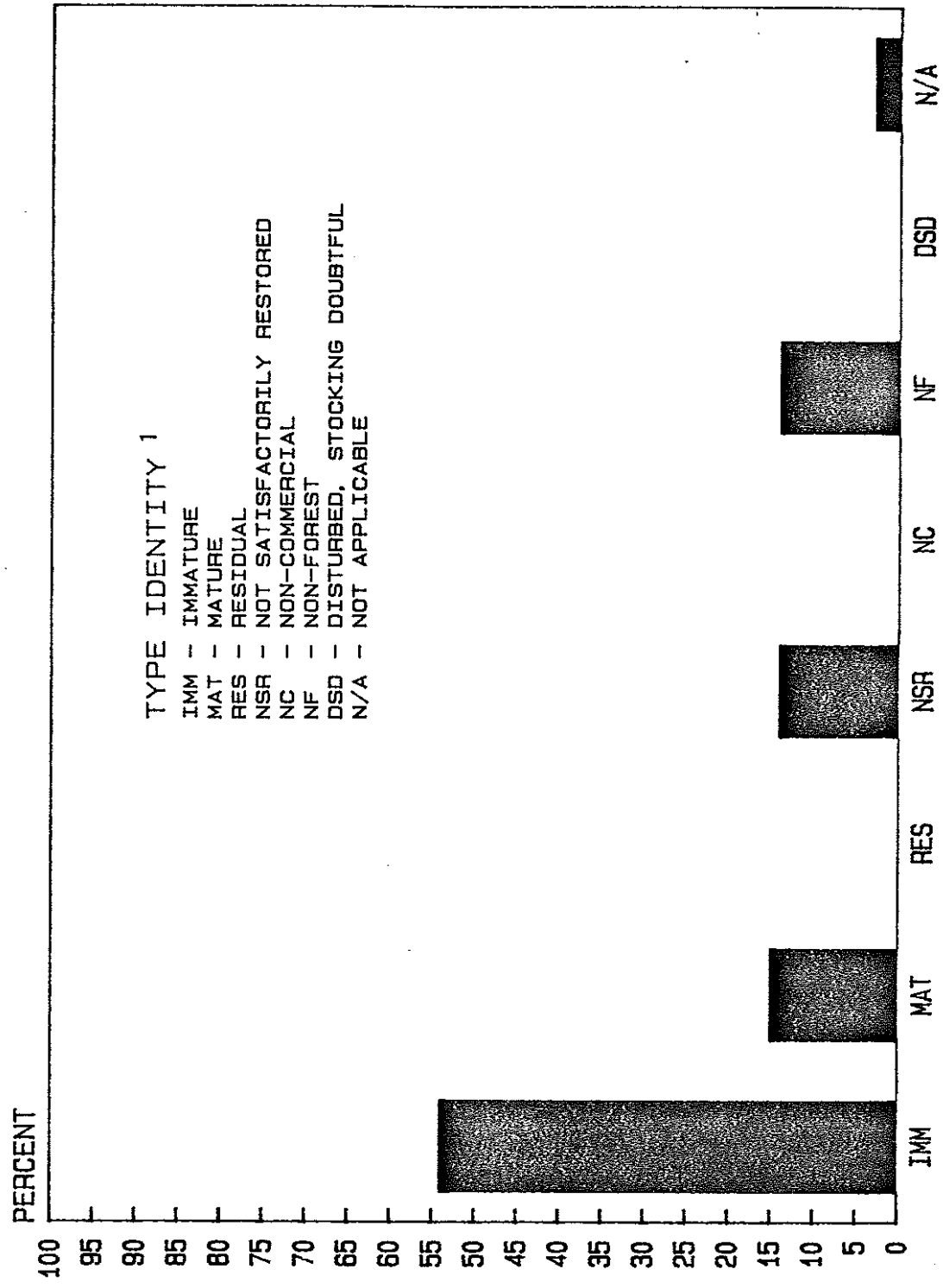
⁴ Represents right-of-way maintenance pesticide applications

⁵ Represents a non-forest right-of-way pesticide application

⁶ Represents the use of a pheromone

FIGURE 6. PERCENT AREA OF FOREST INVENTORY TYPE IDENTITY TREATED WITH PESTICIDES BY B.C. MINISTRY OF FORESTS

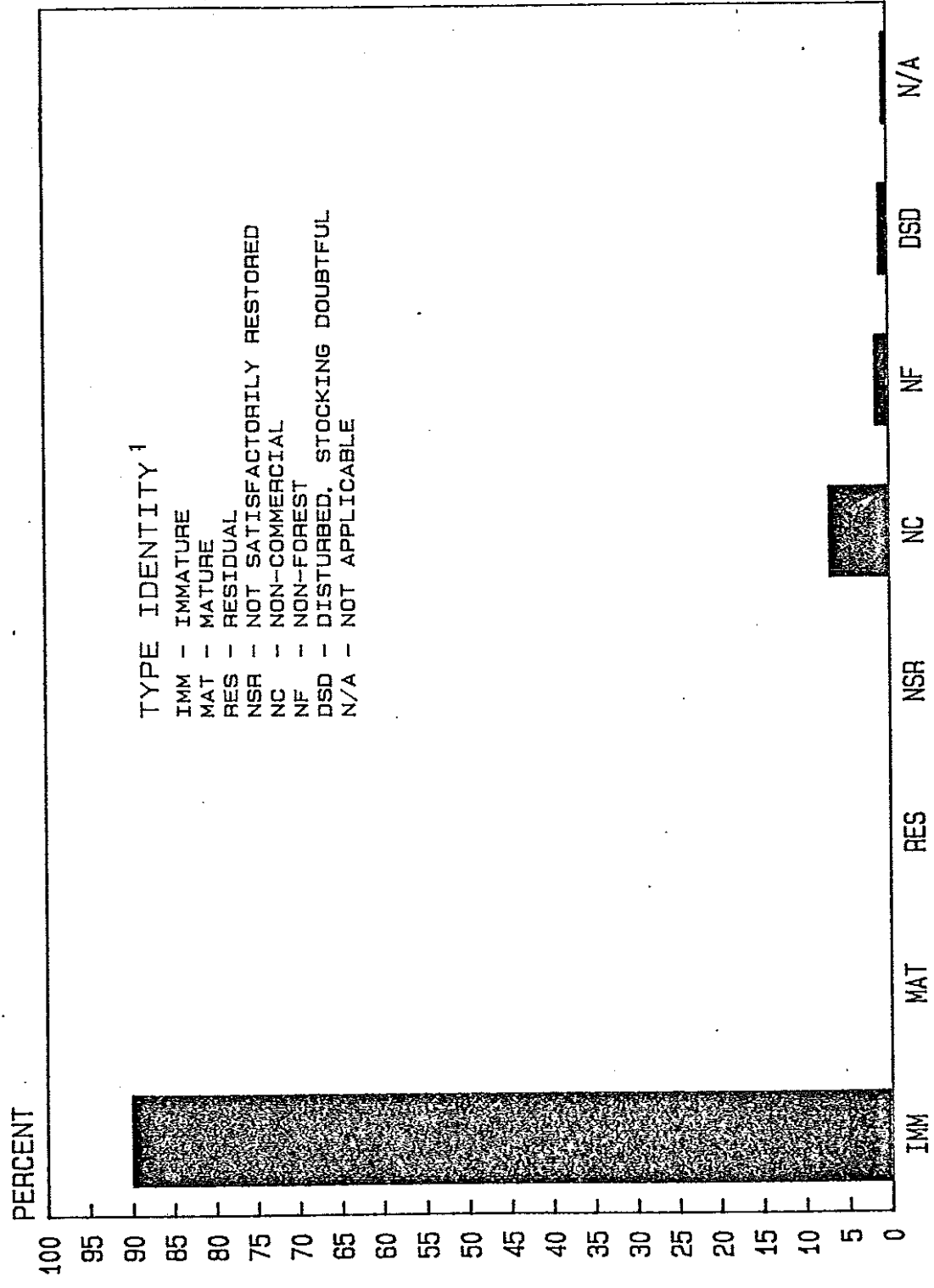
1981



¹Reference: Province of British Columbia. Ministry of Forests. May 1979
Silviculture Manual. Chapter 4, Appendix 4-6

FIGURE 6A. PERCENT AREA OF FOREST INVENTORY TYPE IDENTITY TREATED WITH PESTICIDES BY B.C. FOREST INDUSTRY

1981



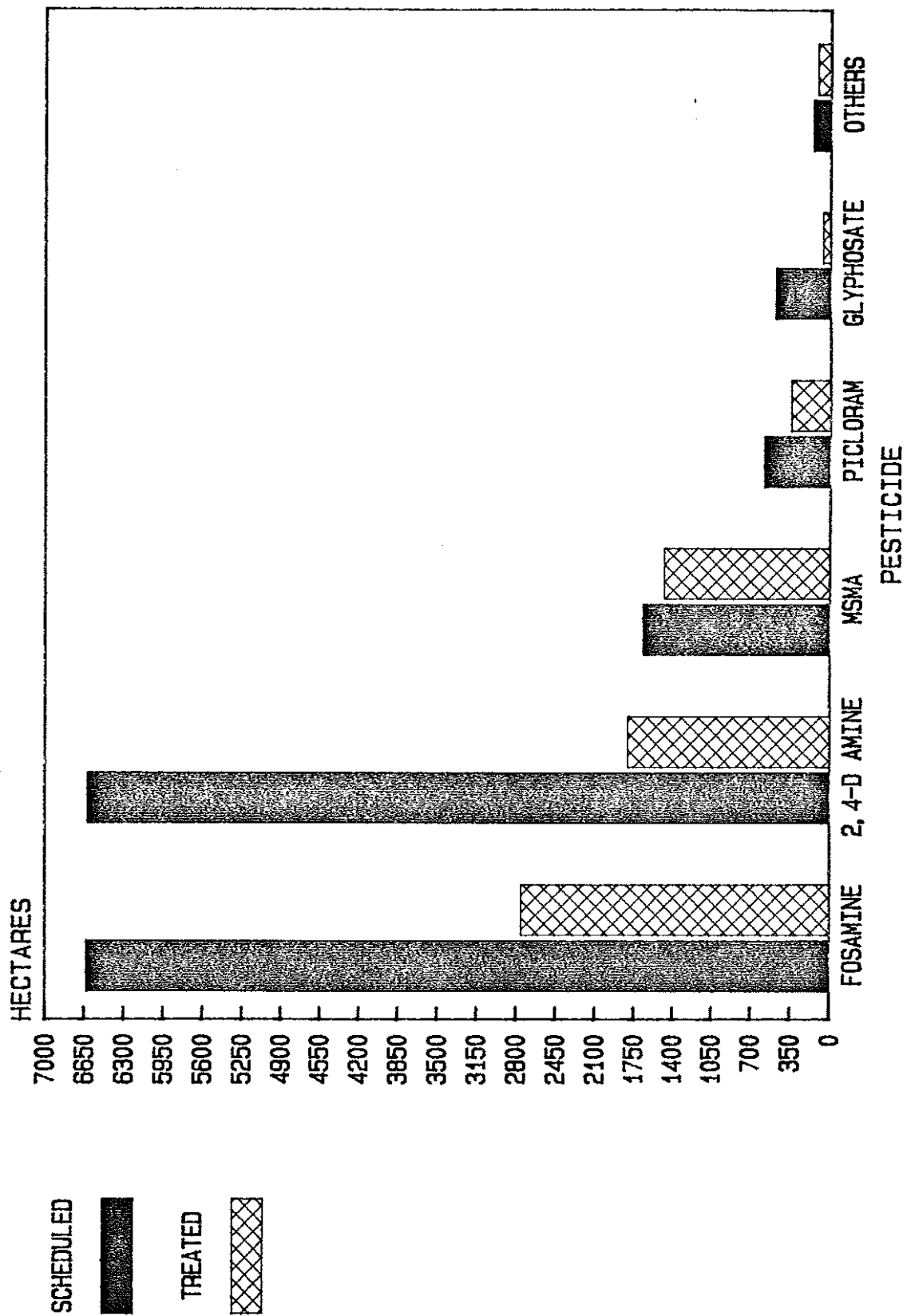
¹ Reference: Province of British Columbia. Ministry of Forests. May 1979
Silviculture Manual. Chapter 4, Appendix 4-6.

TABLE VIII. COMPARISON OF AREAS SCHEDULED FOR
PESTICIDE TREATMENT WITH AREAS ACTUALLY TREATED
1981

PESTICIDE	MINISTRY OF FORESTS		FOREST INDUSTRY	
	Hectares scheduled for treatment	Hectares treated	Hectares scheduled for treatment	Hectares treated
FOSAMINE	4230.2	1753.4	2407.8	1008.8
2,4-D AMINE	753.9	152.3	5873.0	1660.0
MSMA	204.4	108.3	1470.8	1372.6
PICLORAM	588.1	351.9	-	-
GLYPHOSATE	183.6	13.9	309.8	62.0
OTHERS	120.7	100.1	42.0	21.5
TOTAL	6080.9	2479.9	10103.4	4124.9

FIGURE 7. COMPARISON OF AREA SCHEDULED FOR PESTICIDE TREATMENTS WITH AREA ACTUALLY TREATED ¹

1981



¹ B.C. MINISTRY OF FORESTS AND B.C. FOREST INDUSTRY COMBINED.

FIGURE 8. REASONS FOR PESTICIDE USE PERMIT CANCELLATIONS BY AREA AFFECTED 1

1981

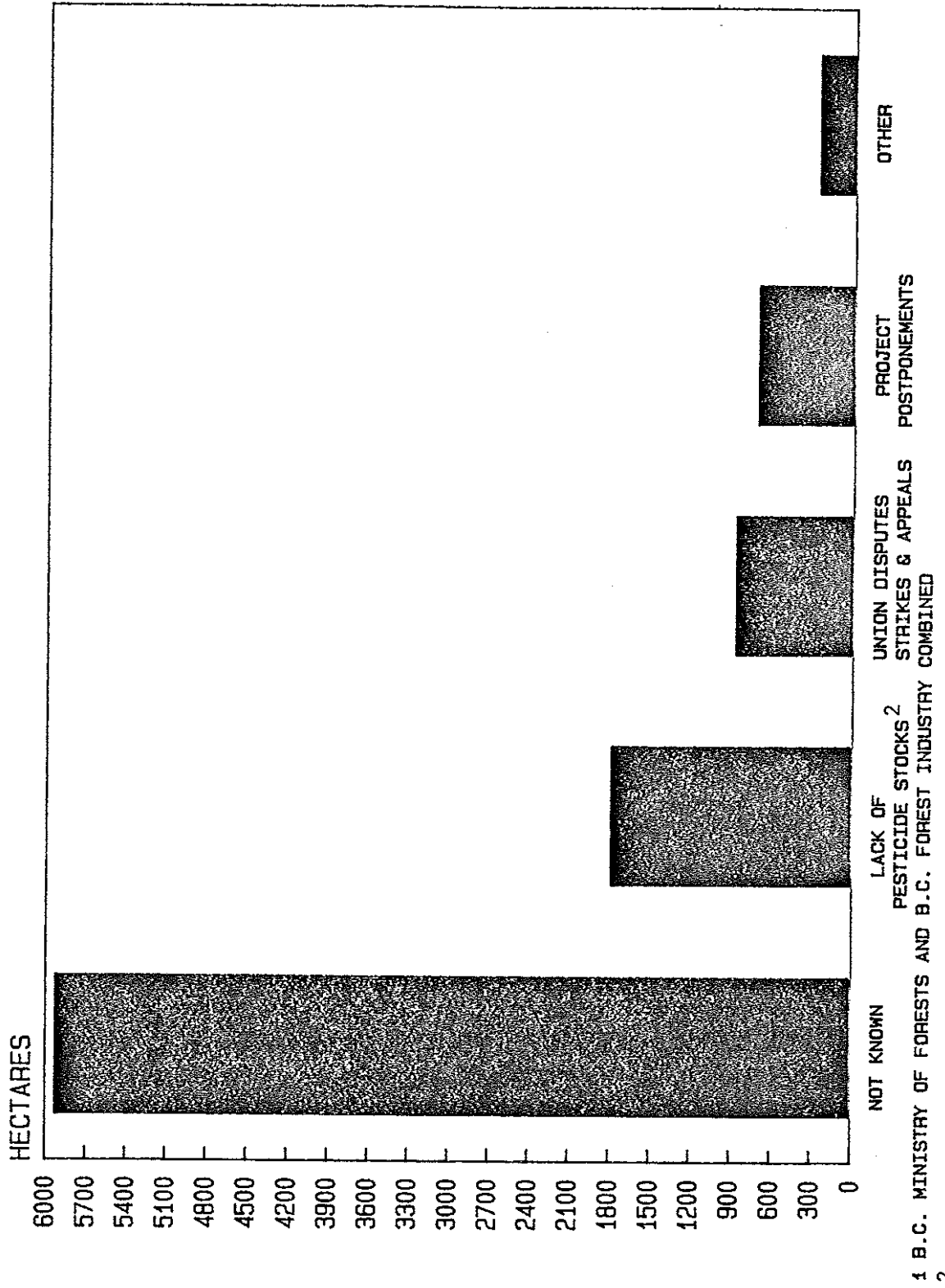
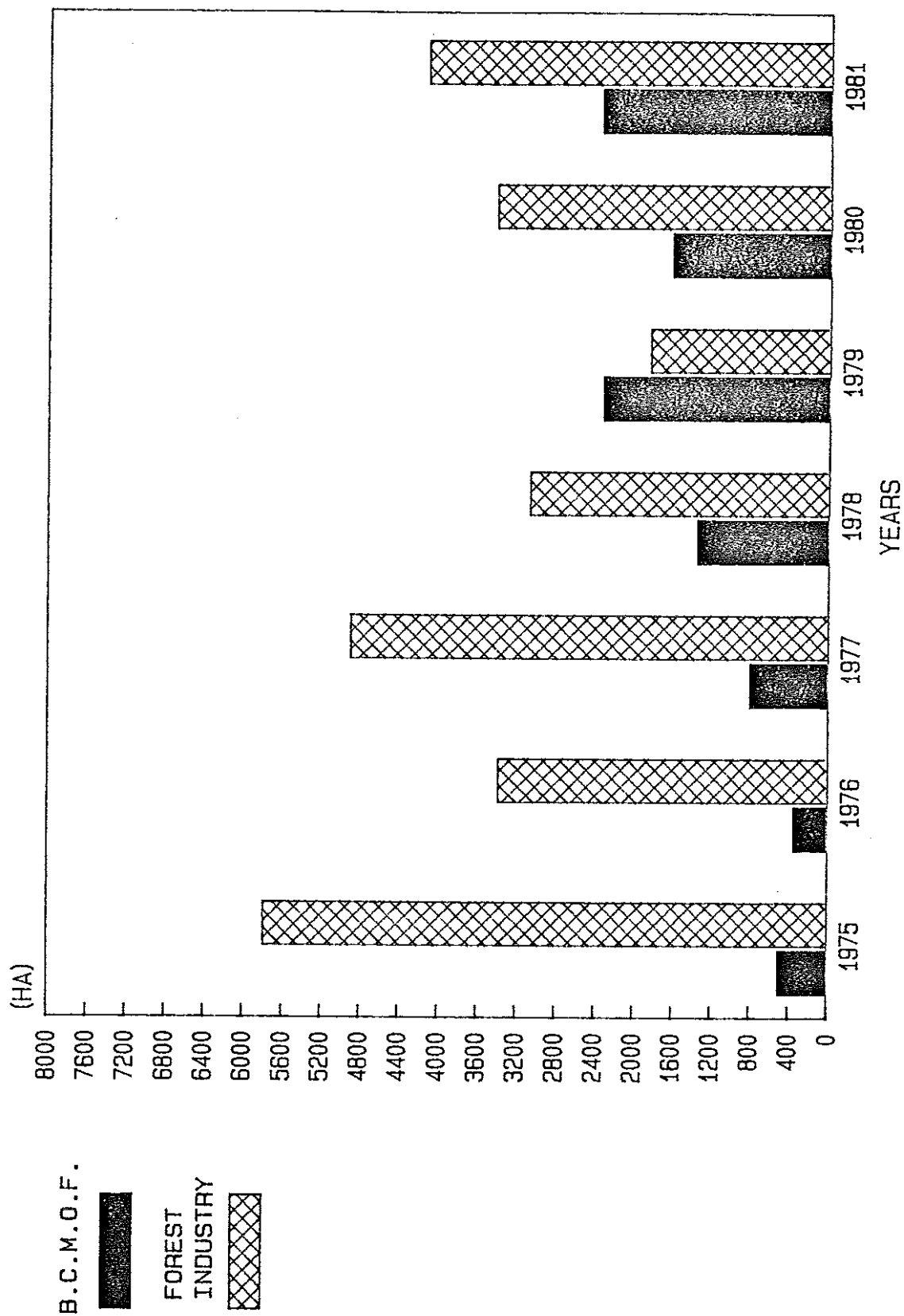


FIGURE 9. TOTAL HECTARES OF LAND TREATED WITH HERBICIDES FOR FORESTRY PURPOSES

1975 - 1981



DISCUSSION AND CONCLUSIONS

The 1981 forestry pesticide use report is the result of recent improvements in storage, retrieval and verification of pesticide use permit data, and it presents the most accurate picture of pesticide use, in a particular year, to date. It is hoped that this quality of information will be improved upon and will continue to be presented on an annual basis.

The use of herbicides for silvicultural purposes continues, as in 1979 and 1980, to be the most common type of forestry pesticide application. It is noteworthy to single out the quantitative impact of the cancellation of herbicide use permits. It appears that, although foresters require the use of herbicides as a silvicultural tool, they are somewhat impeded by factors largely beyond their control.

ACKNOWLEDGEMENTS

For their invaluable assistance in obtaining the information presented in this report, I would like to thank Dr. R. Kobylnyk, Mr. D. Cronin and Ms. S. LeBlanc of the Ministry of Environment.

I would also like to thank Mr. J. Gilmour and Mr. G. Ackerman of the Ministry of Forests' Silviculture Branch, for their help in modifying the Forest Service Stand Tending Report and obtaining follow-up information on research projects.

Finally, my gratitude goes to the foresters and forest managers in industry who have been consistently helpful and cooperative in spite of current staffing shortages and other economic problems.

APPENDIX I
BRITISH COLUMBIA
MINISTRY OF FORESTS
PESTICIDE INVENTORY
FISCAL YEAR 1981/82

MINISTRY OF FORESTS
PESTICIDE INVENTORY
Fiscal Year 1981-82

PESTICIDE PURCHASED	QUANTITY PURCHASED	PURCHASE COST (\$)	QUANTITY USED	PURPOSE OF USE	TOTAL PROGRAM COST (\$)	QUANTITY STORED	QUANTITY DISPOSED
Tordon 22k	954.7 L	19,750	954.7 L	Range Weed Control	142,450	Nil	Nil
Tordon 22k	94.4 L	1,975	75.5 L	Range Weed Control	18,000	18.9 L	Nil
Tordon 22k	416.5 L	7,905	105.7 L	Range Weed Control	22,491	310.8 L	Nil
Tordon 22K	Nil	Nil	4.2 kg	Range Weed Control	* 1,114	Nil	Nil
Total Range Program	1465.6 L	29,630	1135.9 L/ 4.2 kg		184,055	329.7 L	Nil
Roundup	Nil	Nil	.2 L	Brush Control	*50	Nil	Nil
Hyvar	10.0 L	110	.7 L	Brush Control	*50	9.3 L	Nil
Velpar	45.0 Kg	630	1.7 L	Brush Control	*100	43.3 kg	Nil
Krenite	1162.5 L	14,260	17,029.0 L	Brush Control	442,807	Nil	Nil
2,4-D	Nil	Nil	789.6 kg	Brush Control	37,194	Nil	Nil
Asulox F	60.0 L	627	19.5 kg	Brush Control	1,760	Nil	Nil
Total Brush Control	1232.5 L/ 45.0 kg	15,627	17,029.9 L/ 810.8 kg		481,961	9.3 L/ 43.3 kg	Nil

Note: * Estimated

MINISTRY OF FORESTS
PESTICIDE INVENTORY
Fiscal Year 1981-82

PESTICIDE PURCHASED	QUANTITY PURCHASED	PURCHASE COST (\$)	QUANTITY USED	PURPOSE OF USE	TOTAL PROGRAM COST (\$)	QUANTITY STORED	QUANTITY DISPOSED
MSMA	20.0 L	156	4.5 L	Bark Beetle Control	*3,390	15.5 L	Nil
Dursban 4E	23.8 L	670	23.8 L	Bark Beetle Control	*4,000	Nil	Nil
MSMA	140.0 L	3,374	95.0 L	Bark Beetle Control	*71,650	45.0 L	Nil
N.P.V. (Virus) ¹	Nil	Nil	5.05 x 10 ¹² V.I.B.	Douglas-Fir Tussock Moth Control	109,900	Nil	Nil
MSMA	40.0 L	313	10.0 L	Bark Beetle Control	7,500	30.0 L	Nil
MSMA	200.0 L	1,560	2.5 L	Bark Beetle Control	*3,360	197.5 L	Nil
Sevin-4 Oil	Nil	Nil	1.0 L	Bark Beetle Control	*140	Nil	Nil
Total Insect Control	423.8 L	6,073	136.8 L		199,940	288.0 L	Nil

Note: * Estimated

¹ N.P.V. (nuclear polyhedrosis virus) used on an experimental basis for Douglas-fir tussock moth control was purchased by the M.O.F. from F.P.M.I. over a 3 yr. period @ \$6,000/yr prior to the 1981/82 fiscal year. Quantity is expressed in V.I.B. (viral inclusion bodies).

MINISTRY OF FORESTS
NURSERY PESTICIDE INVENTORY
Fiscal Year 1981-82

PESTICIDE PURCHASED	QUANTITY PURCHASED	PURCHASE COST (\$)	QUANTITY USED	PURPOSE OF USE	TOTAL PROGRAM COST (\$)	QUANTITY STORED	QUANTITY DISPOSED
Amtrol-T	580.4 L 394.0 L Carry Over	2,405	311.50 L	Nursery Weed Control	2,715	662.9 L	Nil
A.W.K.	92,420.8 L (3,769.0 L Carry Over)	39,220	36,803.5 L	Nursery Weed Control	42,892	59,386.3 L	Nil
Amitrole	34.5 kg	Carry Over	Nil	Nursery Weed Control	-	34.5 kg	Nil
Arasan 75	1.4 kg	Carry Over	Nil	Nursery Fungi Control	-	1.4 kg	1.4 kg
Atrazine	70.1 L	5,258	2.9 L	Nursery Weed Control	5,310	67.2 L	Nil
Basfapon	14.8 kg	Carry Over	Nil	Nursery Weed Control	-	12.5 kg	2.3 kg
Basamid	25.0 kg	162	Nil	Nursery Weed Control	162	25 kg	Nil
Benlate	351.5 kg	13,896	132.4 kg	Nursery Fungi Control	14,975	219.1 kg	Nil
Bravo	563.2 L	5,069	272.5 L	Nursery Fungi Control	5,562	290.7 L	Nil
Captan	961.5 kg	4,423	288.1 kg	Nursery Fungi Control	4,688	673.4 kg	Nil
Carbaryl 80	6.3 kg	Carry Over	Nil	Nursery Insect Control	-	6.3 kg	Nil
Copper Spray	1.8 kg	16	Nil	Nursery Weed Control	16	1.8 kg	Nil
Copper Sulphate	18.0 kg	27	Nil	Nursery Weed Control	27	18.0 kg	Nil
Chlorine Bleach	161.4 L	105	Nil	Nursery Moss & Algae Control	105	161.4 L	Nil
Daconil	96.6 L	925	71.0 L	Nursery Fungi Control	1,060	25.6 L	Nil
Diazinon	593.5 L	4,935	Nil	Nursery Insect Control	4,935	593.5 L	Nil

MINISTRY OF FORESTS
NURSERY PESTICIDE INVENTORY
Fiscal Year 1981-82

PESTICIDE PURCHASED	QUANTITY PURCHASED	PURCHASE COST (\$)	QUANTITY USED	PURPOSE OF USE	TOTAL PROGRAM COST (\$)	QUANTITY STORED	QUANTITY DISPOSED
Diazinon 5% G	36.7 kg	575	16.7 kg	Nursery Insect Control	627	20.0 kg	Nil
Difolitan	226.2 L	2,150	21.6 L	Nursery Weed Control	2,580	204.6 L	Nil
Dimethoate	54.6 L	300	Nil	Nursery Insect Control	300	54.6 L	Nil
Diquat	352.2 L	4,855	133.2 L	Nursery Weed Control	5,350	219.0 L	Nil
Di-Syston	45.4 kg	156	Nil	Nursery Insect Control	156	45.4 kg	Nil
Dormant Oil	0.6 L	Carry Over 1980	Nil	Nursery Insect Control	-	0.6 L	Nil
Ferbam	1.4 kg	Carry Over	Nil	Nursery Fungi Control	-	1.4 kg	Nil
Furadan	56.0 L	80	Nil	Nursery Insect Control	-	56.0 L	Nil
Fatty Acid Soap	293.1 L	242	116.0 L	Nursery Insect Control	271	177.1 L	Nil
Gramoxone	438.9 L	4,301	74.8 L	Nursery Weed Control	4,447	364.1 L	Nil
Glyphosate	657.8 L	13,972	67.6 L	Nursery Weed Control	14,180	590.2 L	Nil
Garden Dust	0.3 kg	2	Nil	Nursery Insect Control	2	0.3 kg	Nil
Lorox	1.8 kg	27	Nil	Nursery Weed Control	27	1.8 kg	Nil
Lime-Sulphur	26.2 L	33	Nil	Nursery Insect Control	33	26.2 L	Nil
Malathion	122.2 L	Carry Over 1980	Nil	Nursery Insect Control	-	122.2 L	Nil
Orthene	120.6 kg	3,347	75.0 kg	Nursery Insect Control	3,768	45.6 kg	Nil

MINISTRY OF FORESTS
NURSERY PESTICIDE INVENTORY
Fiscal Year 1981-82

PESTICIDE PURCHASED	QUANTITY PURCHASED	PURCHASE COST (\$)	QUANTITY USED	PURPOSE OF USE	TOTAL PROGRAM COST (\$)	QUANTITY STORED	QUANTITY DISPOSED
Pentaphenol	48.0 L	Carry Over 1980	Nil	Wood Preservative	-	48.0 L	Nil
Potassium Oleate	20.0 L	180	9.0 L	Nursery Insect Control	190	11.0 L	Nil
Potassium Cocanate	372.0 L	1,125	172.0 L	Nursery Algae Control	1,231	200.0 L	Nil
Prometone	66.3 L	776	23.3 L	Nursery Weed Control	829	43.0 L	Nil
Prometryne	23.6 L	485	0.3 L	Nursery Weed Control	490	23.3 L	Nil
Propazine	174.8 kg	4,692	66.6 kg	Nursery Weed Control	5,050	108.2 kg	Nil
Sevin	215.6 kg	2,156	7.0 kg	Nursery Insect Control	2,172	208.6 kg	Nil
Simazine	149.8 kg	1,753	32.5 kg	Nursery Weed Control	1,798	117.3 kg	Nil
Sodium Cocanate	400.0 L	1,088	400.0 L	Nursery Algae Control	1,312	Nil	Nil
Termil	0.8 kg	5	Nil	Nursery Fungi Control	5	0.8 kg	Nil
Ureabor	4.2 kg	10	Nil	Nursery Weed Control	10	4.2 kg	Nil
Weevil Bait (Sodium Fluorosilicate)	209.6 kg	1,916	27.7 kg	Nursery Insect Control	1,967	181.9 kg	Nil

1981-82 Total Program Costs = \$129,242

MINISTRY OF FORESTS
PESTICIDE INVENTORY
August, 1982

PESTICIDE CURRENTLY IN STORAGE	QUANTITY CURRENTLY IN STORAGE
2,4-D	5473.0 L
Ambush	0.4 L
Antrol-T	662.9 L
A.W.K.	59386.3 L
Anitrole	34.5 kg
Arasan 75	1.4 kg
Asulox F	60.0 L
Atrazine	67.2 L
Basfapon	12.5 kg
Basamid	25 kg
Benlate	219.1 kg
Bravo	290.7 L
B.t.	1.5 kg
Captan	673.4 kg
Carbaryl 80	6.3 kg
Copper Spray	1.8 kg
Copper Sulphate	18.0 kg
Chlorine Bleach	161.4 L
Daconil	25.6 L
Diazinon	593.5 L
Diazinon 5% G	20.0 kg

MINISTRY OF FORESTS
PESTICIDE INVENTORY
August, 1982

<u>PESTICIDE</u> <u>CURRENTLY</u> <u>IN STORAGE</u> <u>STORAGE</u>	<u>QUANTITY</u> <u>CURRENTLY</u> <u>IN</u>
Difolitan	204.6 L
Dimethoate	65.8 L
Diquat	219.0 L
Di-System	45.4 kg
Dormant Oil	0.6 L
Dursban	64.0 L
Ferbam	1.4 kg
Furadan	56.0 L
Fatty Acid Soap	177.1 L
Gramoxone	364.1 L
Glyphosate	590.2 L
Garden Dust	0.3 kg
Hyvar XL	9.3 L
Krenite F	349.5 L
Lorox	1.8 kg
Lime-Sulphur	26.2 L
Malathion	122.2 L
MSMA	1165.5 L
Orthene	48.1 L
Pentaphenol	48.0 L
Potassium Oleate	11.0 L

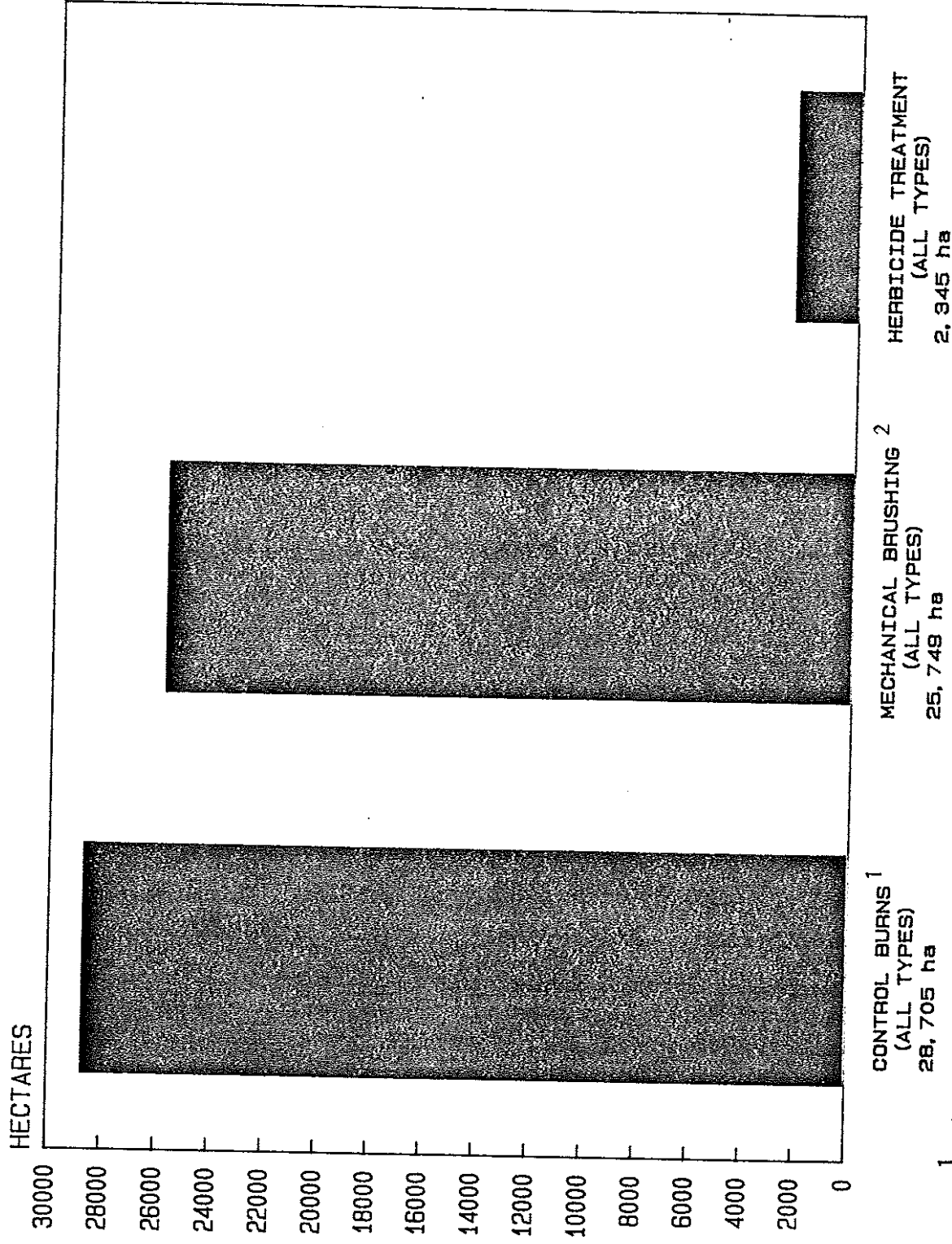
MINISTRY OF FORESTS
PESTICIDE INVENTORY
August, 1982

PESTICIDE CURRENTLY IN STORAGE STORAGE	QUANTITY CURRENTLY IN
Potassium Cocanate	200.0 L
Prometone	43.0 L
Prometryne	23.3 L
Propazine	108.2 L
Roundup	160.8 L
Sevin	226.8 kg
Simazine	117.3 kg
Sodium Cocanate	Nil
Termil	0.8 kg
Tordon 22k	1334.7 L
Tordon 10k	4.5 kg
Ureabor	4.2 kg
Velpar	445.0 kg
Weevil Bait	181.9 kg
(Sodium Fluorosilicate)	

APPENDIX II.
COMPARISON OF CONTROL BURNING,
MECHANICAL BRUSHING AND HERBICIDE
USE BY AREAS TREATED
B.C. MINISTRY OF FORESTS
1981-82 FISCAL
YEAR

APPENDIX II. COMPARISON OF CONTROL BURNING, MECHANICAL BRUSHING AND HERBICIDE USE BY AREAS TREATED.

B.C. MINISTRY OF FORESTS 1981-82 FISCAL YEAR.



¹ Reference: Report of the Ministry of Forests. Fiscal year ending March 31, 1982.
Silviculture program

² Ibid.