PESTICIDE USE

IN BRITISH COLUMBIA FORESTRY

1990

by

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FOREWORD

This report is part of a continuing series initiated in 1981. At that time the B.C. Ministry of Forests (Protection Branch), the Council of Forest Industries of B.C., and the B.C. Ministry of Environment (Pesticide Control Branch) began a cooperative project to collect data on foresty pesticide use in British Columbia. Information contained in these reports is gathered from all forestry pesticide permit holders, on an annual basis, by the Pesticide Control Branch, and represents only those permits that were active in 1990. Data includes quantities (kg of active ingredient) of each pesticide applied and total area (ha) treated. Area treated is broken down by control purpose and method of application. Also included in this report are forest region and district summaries of pesticide use, as well as herbicide and insecticide use trends from 1980 - 1990.

INTRODUCTION

This report is part of a continuing series that began in 1981. At that time a cooperative project was initiated by the B.C. Ministry of Forests (Protection Branch), the Council of Forest Industries of B.C., and the B.C. Ministry of Environment (Pesticide Control Branch) to establish annual records of forestry pesticide use on crown land in British Columbia.

In 1983, the Pesticide Control Branch initiated a requirement of all pesticide use permit holders to submit follow-up reports on a calendar year basis. This data is summarized in tables and graphs on the following pages and includes the following information:[1]

1. Numbers of 1990 forestry permit applications submitted; denied; cancelled and appealed.

2. Environmental Appeal Board decisions on all appealed permits.

3. Provinical summary of area (ha) treated and active ingredient (kg a.i.) used by individual pesticide.

4. Forest region and district summaries of area (ha) treated by pesticide, control purpose and method of application.

5. Provincial summaries of area (ha) treated by control purpose and method of application.

6. Area (ha) of forest land treated with herbicides and insecticides, 1980-1990.

The above information is also divided by the user - i.e., B.C. Forest Service or forest industry.

[1]This report was based on all follow-up reports received by April 1991.

Totals in hectares may differ slightly in each table and graph because of rounding. Totals in forest region summaries are slightly lower than provincial summaries because provincial summaries refelect permits that were used to apply pesticides in several regions.

RESULTS OF THE 1990 SURVEY

Pesticide Control Branch reviewed 335 forestry pesticide use applications in 1990 and issued 321 permits (Table I).

Sixteen permits were appealed in 1990 and Environmental Appeal Board decisions were as follows: nine supported and, seven amended (Table II).

A total of 57 662 hectares (ha) of B.C. forest and range (Crown) land were treated with pesticides in 1990. The B.C. Forest Service applied pesticides to 21 058 ha (36%) and forest industry to 36 603 ha (64%).

The herbicides glyphosate and picloram were the most widely used products. Glyphosate was applied to 48 976 ha, 85% of the total area treated in the province in 1990, and picloram to 6 476 ha. These were followed by 2,4-D (1 052 ha), MSMA (431 ha), ***Bacillus thuringiensis*** var. ***kurstaki (B.t.k.)*** (360 ha) and hexazinone (308 ha) (Table III, Figure 1).

Quantities of pesticides applied in kilograms of active ingredient (kg a.i.) are shown in Table III and Figure 2.

Summaries of pesticide use by individual forest regions and districts are shown on pages 12 - 59.

The majority of pesticide applications occurred in the Prince George Forest Region (27 143 ha), followed by Vancouver (9 782 ha), Cariboo (5 092 ha) and Prince Rupert (4 778 ha) (Table IV, Figure 3).

Herbicide applications for the purpose of controlling vegetation (i.e. crop establishment (brushing), crop growth enhancement (conifer release)) remain the most common type of forestry operation involving pesticides.

Herbicides were applied to 43 569 ha for brushing and conifer release operations and to 4 389 ha to prepare harvested sites for planting. Pre-harvest and site rehabilitation treatments were conducted on 1 210 ha, and 425 ha, respectively. Herbicides were also applied to 6 479 ha for range land management (noxious weed control). Insecticides were applied to 845 ha (Table VII, Figure 4).

Pesticides were aerially applied to 39 010 ha of forest land. This area was divided almost equally between helicopter operations and fixed-wing aircraft operations. Tree injection application methods were used over 7 623 ha, while backpack sprayers and vehicle mounted sprayers were used to apply pesticides to 11 029 ha (Tables VIII, Figure 5).

Herbicides were applied to a total of 56 810 ha, of forest and rangeland in 1990. Insecticides were applied to 845 ha (Table IX, Figures 6 and 7).

TABLE I
THE STATUS OF 1990 PESTICIDE USE APPLICATIONS AND PERMITS ISSUED BY THE PESTICIDE CONTROL BRANCH

	B.C. FOREST SERVICE	FOREST INDUSTRY	TOTAL
APPLICATIONS SUBMITTED	157	178	335
APPLICATIONS WITHDRAWN OR DENIED	4	10	14
PERMITS ISSUED (TOTAL)	153	168	321
PERMITS CANCELLED REVOKED OR SUSPENDED BY THE PESTICIDE CONTROL BRANCH	0	0	0

TABLE II
THE STATUS OF APPEALED 1990 PESTICIDE USE PERMITS
AS DETERMINED BY THE B.C. ENVIRONMENTAL APPEAL BOARD

	B.C. FOREST SERVICE	FOREST INDUSTRY	TOTAL
PERMITS APPEALED	5	11	16
APPEALED PERMITS CANCELLED/REVOKED	0	0	0
APPEALED PERMITS AMENDED[1]	5	2	7
APPEALED PERMITS SUPPORTED	0	9	9
HEARINGS OR DECIIONS PENDING	0	0	0

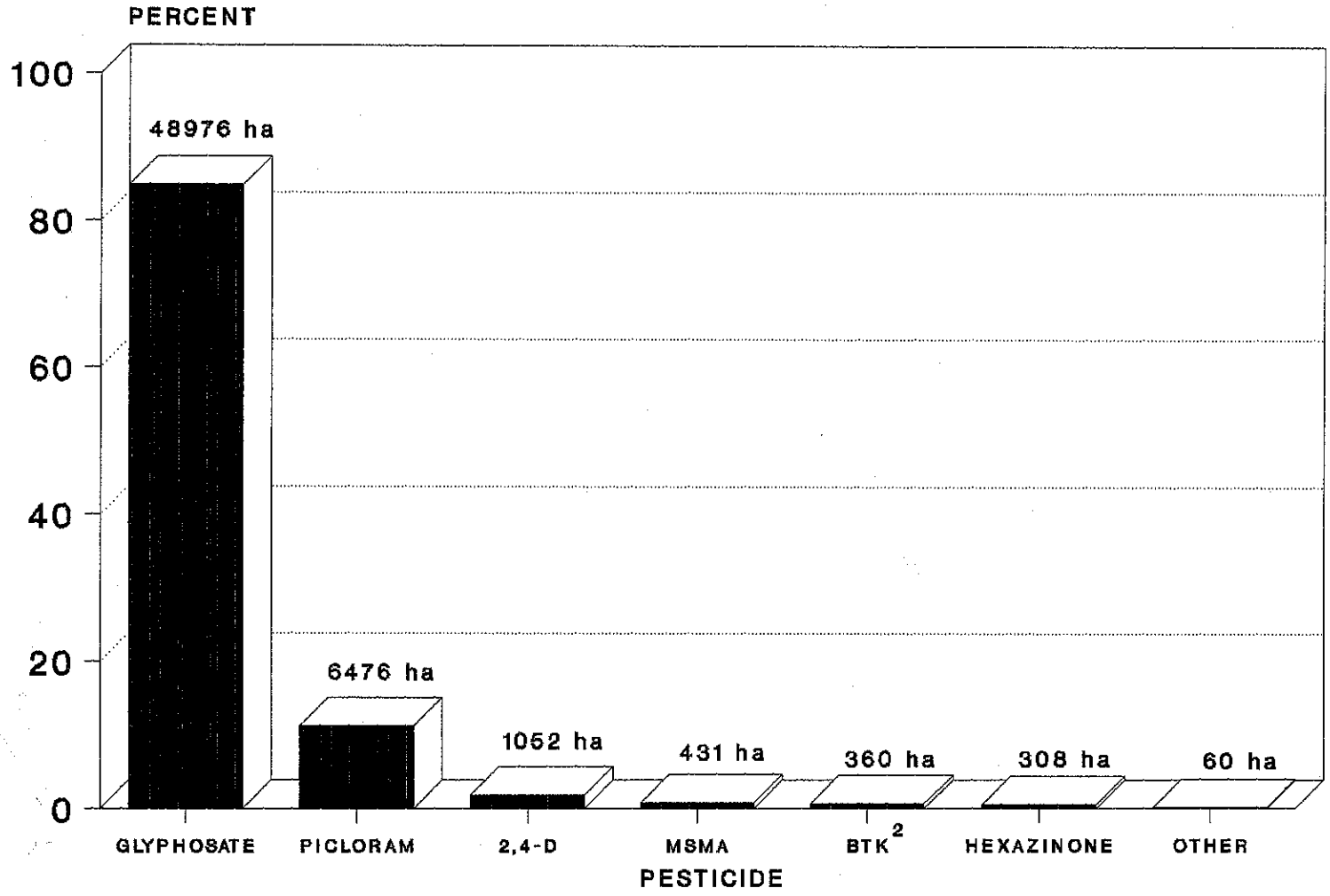
[1]Permits extended one year by the Appeal Board are not considered to be amended.

TABLE III
PROVINCIAL SUMMARY OF AREA (ha)
TREATED AND ACTIVE INGREDIENT (kg a.i.) USED
BY PESTICIDE, 1990

PESTICIDE	BC FOREST SERVICE		FOREST INDUSTRY	
	ha treated	kg. a.i. applied	ha treated	kg. a.i. applied
2, 4-D amine	90.800	436.175	937.000	551.950
2, 4-D ester	0.000	0.000	24.000	88.400
acephate	0.012	0.077	0.050	0.030
B.t.k.[1]	0.000	0.000	360.000	900.000
carbaryl	0.840	13.440	0.000	0.000
chlorpyrifos	0.760	49.440	0.000	0.000
cyclohexnon	16.000	70.000	0.000	0.000
diphacinone	0.000	0.000	0.044	0.005
glyphosate	13 983.642	22 356.802	34 992.979	57 069.120
hexazinone	27.300	83.686	280.800	293.600
metalazyl	2.370	2.023	0.000	0.000
mineral oil	0.160	80.000	0.000	0.000
MSMA	423.913	810.200	7.020	54.980
oxydemeton	0.012	0.073	0.000	0.000
picloram	6 476.172	3 529.725	0.393	0.220
pirmicarb	0.005	0.093	0.000	0.000
putrid eggs	0.000	0.000	0.800	0.130
trealemefon	0.350	0.080	0.000	0.000
triclopyr	0.100	0.100	0.000	0.000
verbenone	36.000	29.440	0.000	0.000

[1] *Bacillus Thuringiensis* var. *kurstaki*

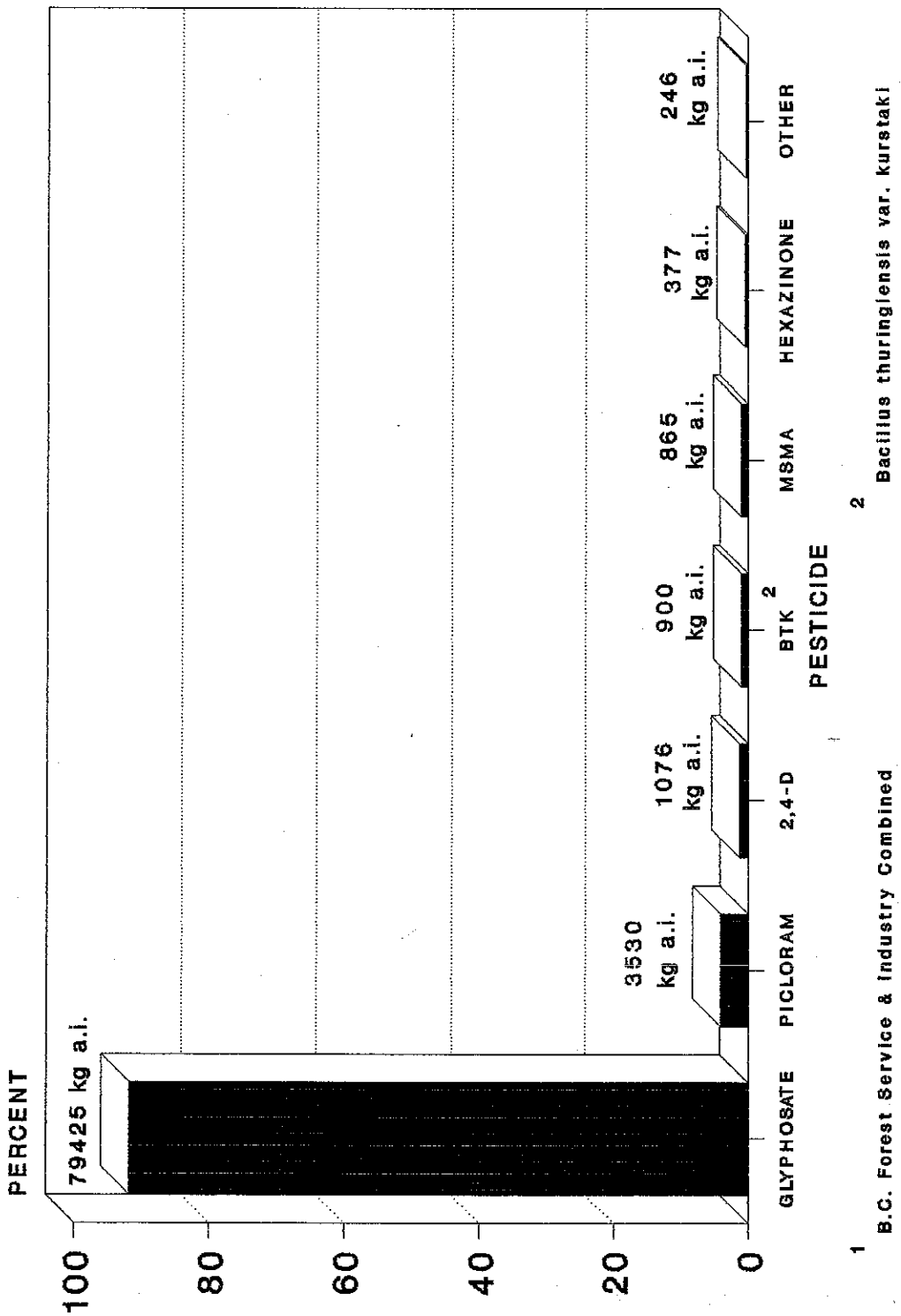
PESTICIDE USE
IN PERCENT (ha) TREATED, 1990 [1]



[1] B.C. Forest Service & Industry Combined

[2] Bacillus thuringiensis var. kurstaki

PESTICIDE USE
IN PERCENT ACTIVE INGREDIENT
(kg a.i.) APPLIED, 1990[1]



[1] B.C. Forest Service & Industry Combined

[2] Bacillus thuringlensis var. kurstaki

TABLE IV
REGIONAL SUMMARY OF AREA (ha) TREATED
BY PESTICIDE, 1990
BCFS AND FOREST INDUSTRY

FOREST REGION	glyphosate	2, 4-D	hexazinone	picloram	B.t.k.	Other	Totals
VANCOUVER	8 458.128	937.000	0.000	0.010	360.000	26.644	9 781.782
PRINCE RUPERT	4 750.860	0.000	0.000	13.380	0.000	13.860	4 778.100
PRINCE GEORGE	26 727.412	0.000	51.600	37.221	0.000	326.973	27 143.206
KAMLOOPS	1 551.116	0.000	0.000	6 334.063	0.000	94.360	7 979.539
NELSON	593.930	0.000	0.000	91.891	0.000	34.070	719.891
CARIBOO	4 834.765	0.000	256.500	0.000	0.000	1.010	5 092.275
TOTALS:	**46 916.211**	**937.000**	**308.100**	**6 476.565**	**360.000**	**496.917**	**55 494.793**
(%)	84.54	1.69	0.56	11.67	0.65	0.90	100.00

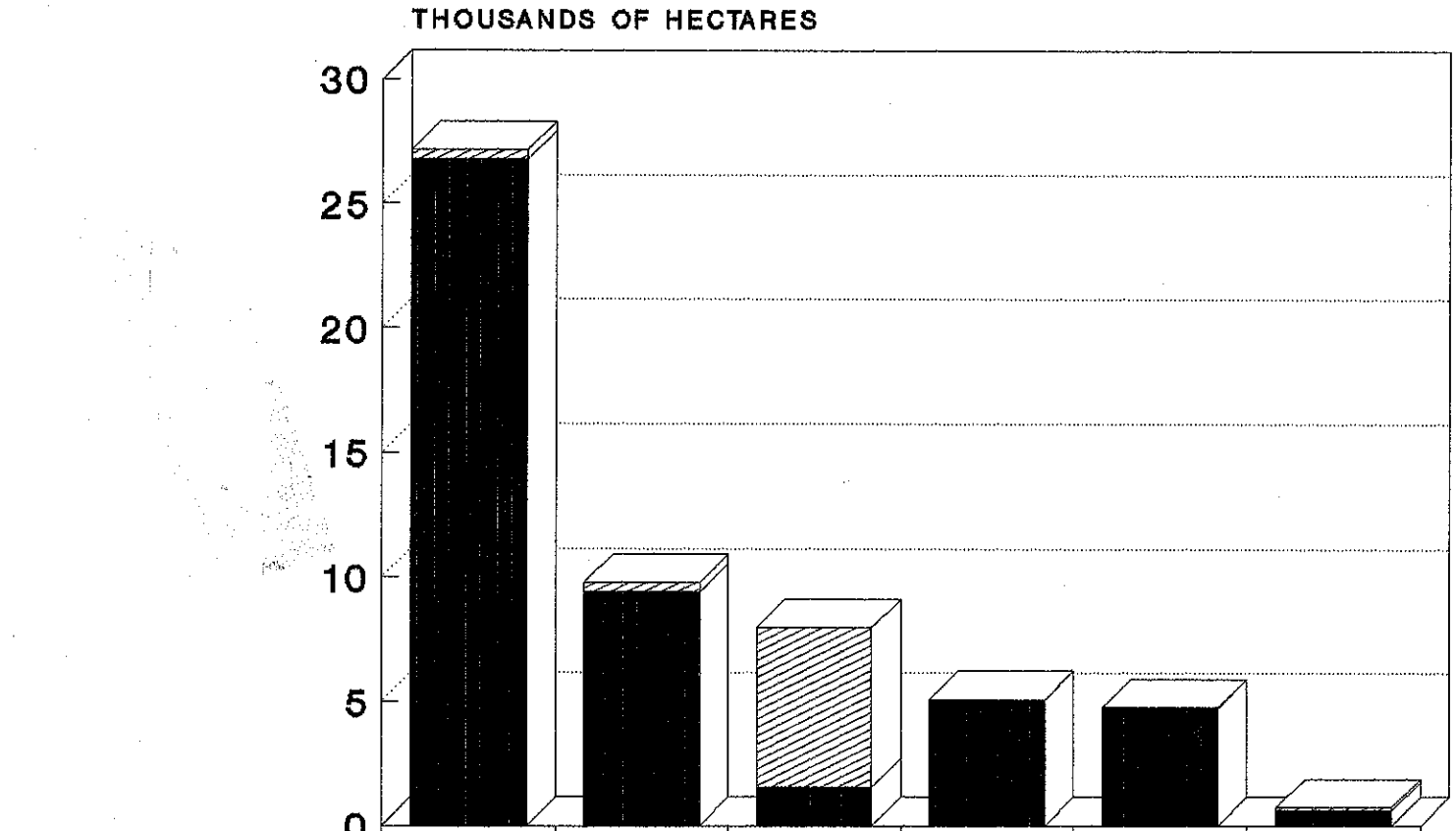
TABLE V
REGIONAL SUMMARY OF AREA (ha) TREATED
BY CONTROL PURPOSE, 1990
BCFS AND FOREST INDUSTRY

FOREST REGION	VEGETATION MGMNT	INSECT MGMNT	RANGE MGMNT	OTHER	TOTAL
VANCOUVER	9 419.238	361.350	0.000	1.194	9 781.782
PRINCE RUPERT	4 747.740	13.360	13.500	3.500	4 778.100
PRINCE GEORGE	26 778.590	326.523	38.093	0.000	27 143.206
KAMLOOPS	1 551.499	93.590	6 333.680	0.770	7 979.539
NELSON	591.930	33.470	93.891	0.600	719.891
CARIBOO	5 091.265	0.510	0.000	0.500	5 092.275
TOTALS:	**48 180.262**	**828.803**	**6 479.164**	**6.564**	**55 494.793**
(%)	86.82	1.49	11.68	0.01	100.00

TABLE VI
REGIONAL SUMMARY OF AREA (ha)
TREATED BY METHOD OF APPLICATION, 1990
BCFS AND FOREST INDUSTRY

FOREST REGION	AERIAL SPRAY	GROUND APPLICATION	STEM INJECTION	TOTALS
VANCOUVER	3 694.220	1 492.564	4 594.998	9 781.782
PRINCE RUPERT	3 699.540	476.700	601.860	4 778.100
PRINCE GEORGE	24 513.900	990.973	1,638.333	27 43.206
KAMLOOPS	460.500	7 086.230	432.809	7 979.539
NELSON	415.630	103.741	200.520	719.891
CARIBOO	4 356.065	735.700	0.510	5 092.275
TOTALS:	**37 139.855**	**10 885.908**	**7 469.030**	**55 494.793**
(%)	66.92	19.62	13.46	100.00

AREA TREATED WITH PESTICIDES
PROVINCIAL SUMMARY BY FOREST REGION 1990 [1]



	PR. GEORGE	VANCOUVER	KAMLOOPS	CARIBOO	PR. RUPERT	NELSON
INSECT,RANGE & OTHER	0.365	0.362	6.428	0.001	0.03	0.128
VEGETATION MGMT.	26.78	9.419	1.551	5.091	4.748	0.592

REGION

[1] B.C. Forest Service & Industry Combined

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: VANCOUVER					
B.C. FOREST SERVICE					
FOREST BRUSHING[1]	1 310.570	glyphosate	1 004.830	305.740	0.000
FOREST CONIFER RELEASE[2]	895.600	2, 4-D amine	0.000	0.000	0.000
		glyphosate	137.500	35.400	722.600
		triclopyr	0.000	0.100	0.000
FOREST NURSERY FUNGUS CONTROL	0.350	triademefon	0.000	0.350	0.000
FOREST SITE PREPARATION	36.000	glyphosate	14.000	22.000	0.000
FOREST SITE REHABILITATION	66.800	glyphosate	66.800	0.000	0.000
SUB TOTALS:	**2 309.320**		**1 223.130**	**363.590**	**722.600**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: VANCOUVER FOREST INDUSTRY					
FOREST BRUSHING[1]		2, 4-D amine	0.000	0.000	772.000
		glyphosate	1 388.140	163.200	2 353.000
		picloram	0.000	0.000	0.010
	4 676.350				
FOREST CONIFER RELEASE[2]		2, 4-D amine	0.000	0.000	136.000
		glyphosate	340.350	496.750	611.338
	1 584.438				
FOREST INSECT CONTROL		acephate	0.000	0.000	0.050
		B.t.k.	360.000	0.000	0.000
		MSMA	0.000	1.300	0.000
	361.350				
FOREST RIGHT-OF WAY MAINIENANCE		2, 4-D amine	0.000	29.000	0.000
		2, 4-D ester	0.000	24.000	0.000
		glyphosate	0.000	335.350	0.000
	388.350				
FOREST SITE PREPARATION		glyphosate	382.600	78.530	0.000
	461.130				
FOREST VERTEBRATE CONTROL		diphacinone	0.000	0.044	0.000
		putrid eggs	0.000	0.800	0.000
	0.844				
SUB TOTALS:	**7 472.462**		**2 471.090**	**1 128.974**	**3 872.398**
TOTALS:	**9 781.782**		**3 694.220**	**1 492.564**	**4 594.998**

[1]Throughout this report Forest Brushing refers to treatments that ensure tree crop establishment and survival.

[2]Throughout this report Forest Conifer Release refers to treatments that enhance the growth of the established tree crop.

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: CHILLIWACK**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	582.580	glyphosate	580.380	2.200	0.000
FOREST CONIFER RELEASE	30.600	glyphosate	0.000	0.000	30.600
FOREST SITE PREPARATION	14.000	glyphosate	14.000	0.000	0.000
FOREST SITE REHABILITATION	66.800	glyphosate	66.800	0.000	0.000
SUB TOTALS:	**693.980**		**661.180**	**2.200**	**30.600**
FOREST INDUSTRY					
FOREST BRUSHING	536.850	glyphosate picloram	536.840 0.000	0.000 0.000	0.000 0.010
FOREST CONIFER RELEASE	158.488	glyphosate	156.350	0.500	1.638
FOREST INSECT CONTROL	1.300	MSMA	0.000	1.300	0.000
FOREST RIGHT-OF-WAY MAINTENENCE	24.000	2, 4-D ester	0.000	24.000	0.000
FOREST SITE PREPARATION	60.100	glyphosate	60.100	0.000	0.000
SUB TOTALS:	**780.738**		**753.290**	**25.800**	**1.648**
TOTALS:	**1 474.718**		**1 414.47**	**28.000**	**32.248**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: SQUAMISH**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	416.690	glyphosate	411.150	5.540	0.000
FOREST CONIFER RELEASE	13.500	glyphosate	13.500	0.000	0.000
SUB TOTALS:	430.190		424.650	5.540	0.000
FOREST INDUSTRY					
FOREST BRUSHING	134.600	glyphosate	131.000	3.600	0.000
FOREST CONIFER RELEASE	35.000	glyphosate	35.000	0.000	0.000
SUB TOTALS:	169.600		166.000	3.600	0.000
TOTALS:	**599.790**		**590.65**	**9.14**	**0.00**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: SUNSHINE COAST**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPL	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING AND WEEDING	26.300	glyphosate	0.000	26.300	0.000
FOREST CONIFER RELEASE	169.000	glyphosate	124.000	0.000	45.000
FOREST SITE PREPARATION	22.000	glyphosate	0.000	22.000	0.000
SUB TOTALS:	**217.300**		**124.000**	**48.300**	**45.00**
FOREST INDUSTRY					
FOREST BRUSHING AND WEEDING	112.100	glyphosate	112.100	0.000	0.000
FOREST CONIFER RELEASE	48.000	glyphosate	0.000	48.000	0.000
FOREST SITE PREPARATION	72.600	glyphosate	0.000	72.600	0.000
SUB TOTALS:	**232.700**		**112.100**	**120.600**	**0.000**
TOTALS:	**450.000**		**236.100**	**168.900**	**45.00**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: DUNCAN**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHOD		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST NURSERY FUNGUS CONTROL	0.050	triademefon	0.000	0.050	0.000
SUB TOTALS:	**0.050**		**0.000**	**0.050**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	349.400	glyphosate	150.000	106.100	93.300
FOREST CONIFER RELEASE	105.700	glyphosate	0.000	75.700	30.000
FOREST RIGHT-OF-WAY MAINTENANCE	2.700	glyphosate	0.000	2.700	0.000
FOREST VERTEBRATE CONTROL	0.844	diphacinone putrid eggs	0.000 0.000	0.044 0.800	0.000 0.000
SUB TOTALS:	**458.644**		**150.000**	**185.344**	**123.300**
TOTALS:	**458.694**		**150.000**	**185.394**	**123.300**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: PORT ALBERNI**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST CONIFER RELEASE	0.100	triclopyr	0.000	0.100	0.000
SUB TOTALS:	**0.100**		**0.000**	**0.100**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	1 554.700	2,4-D amine	0.000	0.000	772.000
		glyphosate	28.000	4.500	750.200
FOREST RIGHT-OF-WAY MAINTENANCE	19.000	glyphosate	0.000	19.000	0.000
SUB TOTALS:	**1 573.700**		**28.000**	**23.500**	**1 522.200**
TOTALS:	**1 573.800**		**28.000**	**23.600**	**1 522.200**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: CAMPBELL RIVER**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	87.800	glyphosate	11.500	76.300	0.000
FOREST CONIFER RELEASE	35.200	2, 4-D amine glyphosate	0.000 0.000	0.000 35.200	0.000 0.000
FOREST NURSERY FUNGUS CONTROL	0.300	treademefon	0.000	0.300	0.000
SUB TOTALS:	**123.300**		**11.500**	**111.800**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	102.900	glyphosate	100.900	2.000	0.000
FOREST CONIFER RELEASE	888.150	2, 4-D amine glyphosate	0.000 0.000	0.000 255.850	136.000 496.300
FOREST INSECT CONTROL	0.050	acephate	0.000	0.000	0.050
FOREST RIGHT-OF-WAY MAINTENANCE	237.500	2, 4-D amine glyphosate	0.000 0.000	29.000 208.500	0.000 0.000
FOREST SITE PREPARATION	202.530	glyphosate	196.600	5.930	0.000
SUB TOTALS:	**1 431.130**		**297.500**	**501.280**	**632.350**
TOTALS:	**1 554.43**		**309.000**	**613.080**	**632.350**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: PORT MCNEILL**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHOS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	1.800	glyphosate	1.800	0.000	0.000
FOREST CONIFER RELEASE	475.000	glyphosate	0.000	0.000	475.000
SUB TOTALS:	**476.800**		**1.800**	**0.000**	**475.000**
FOREST INDUSTRY					
FOREST BRUSHING	1 477.600	glyphosate	282.600	47.000	1,148.000
FOREST CONIFER RELEASE	349.100	glyphosate	149.000	116.700	83.400
FOREST INSECT CONTROL	360.000	B.t.k.	360.000	0.000	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	105.150	glyphosate	0.000	105.150	0.000
SUB TOTALS:	**2 291.850**		**791.600**	**268.850**	**1 231.400**
TOTALS:	**2 768.650**		**793.400**	**268.850**	**1 706.400**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: MID-COAST**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	175.800	glyphosate	0.000	175.800	0.000
SUB TOTALS:	**175.800**		**0.000**	**175.800**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	46.700	glyphosate	46.700	0.000	0.000
FOREST SITE PREPARATION	125.900	glyphosate	125.900	0.000	0.000
SUB TOTALS:	**172.600**		**172.600**	**0.000**	**0.000**
TOTALS:	**348.400**		**172.600**	**175.800**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: VANCOUVER **DISTRICT: QUEEN CHARLOTTE ISLANDS**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	19.600	glyphosate	0.000	19.600	0.000
FOREST CONIFER RELEASE	172.000	glyphosate	0.000	0.000	172.000
SUB TOTALS:	**191.600**		**0.000**	**19.600**	**172.000**
FOREST INDUSTRY					
FOREST BRUSHING	361.500	glyphosate	0.000	0.000	361.500
SUB TOTALS:	**361.500**		**0.000**	**0.000**	**361.500**
TOTALS:	**553.100**		**0.000**	**19.600**	**533.500**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: PRINCE RUPERT B.C. FOREST SERVICE					
FOREST BRUSHING	617.240	glyphosate	547.740	69.500	0.000
FOREST CONIFER RELEASE	0.200	glyphosate	0.000	0.200	0.000
FOREST FUNGUS CONTROL	3.000	glyphosate	0.000	0.000	3.000
FOREST INSECT CONTROL	13.360	MSMA	0.000	0.000	13.360
FOREST NURSERY FUNGUS CONTROL	0.500	metalaxyl	0.000	0.500	0.000
FOREST RANGE MANAGEMENT	13.500	glyphosate picloram	0.000 0.000	0.120 13.350	0.000 0.000
FOREST SITE REHABILITATION	250.700	glyphosate	174.700	76.000	0.000
SUB TOTALS:	**898.500**		**722.440**	**159.700**	**16.360**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: PRINCE RUPERT FOREST INDUSTRY					
FOREST BRUSHING	2 382.800	glyphosate	1 782.100	15.200	585.500
FOREST CONIFER RELEASE	1 310.000	glyphosate	1 023.200	286.800	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	15.000	glyphosate	0.000	15.000	0.000
FOREST SITE PREPARATION	171.800	glyphosate	171.800	0.000	0.000
SUB TOTALS:	**3 879.600**		**2 977.100**	**317.000**	**585.500**
TOTALS:	**4 778.100**		**3 699.540**	**476.700**	**601.860**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE RUPERT **DISTRICT: LAKES**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INDUSTRY					
FOREST CONIFER RELEASE	90.000	glyphosate	90.000	0.000	0.000
TOTALS:	**90.000**		**90.000**	**0.000**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE RUPERT **DISTRICT: MORICE**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	155.000	glyphosate	85.500	69.500	0.000
FOREST INSECT CONTROL	11.360	MSMA	0.000	0.000	11.360
FOREST RANGE MANAGEMENT	13.500	glyphosate picloram	0.000 0.000	0.120 13.380	0.000 0.000
SUB TOTALS:	**179.860**		**85.500**	**83.000**	**11.360**
FOREST INDUSTRY					
FOREST BRUSHING	750.400	glyphosate	735.200	15.200	0.000
FOREST CONIFER RELEASE	1 220.000	glyphosate	933.200	286.800	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	15.000	glyphosate	0.000	15.000	0.000
FOREST SITE PREPARATION	160.000	glyphosate	160.000	0.000	0.000
SUB TOTALS:	**2 145.400**		**1 828.400**	**317.000**	**0.000**
TOTALS:	**2 325.260**		**1 913.900**	**400.00**	**11.360**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE RUPERT **DISTRICT: BULKLEY**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	121.140	glyphosate	121.140	0.000	0.000
FOREST FUNGUS CONTROL	3.000	glyphosate	0.000	0.000	3.000
FOREST INSECT CONTROL	2.000	MSMA	0.000	0.000	2.000
FOREST SITE REHABILITATION	174.700	glyphosate	174.700	0.000	0.000
SUB TOTALS:	**300.840**		**295.840**	**0.000**	**5.000**
FOREST INDUSTRY					
FOREST BRUSHING	1 009.200	glyphosate	1 009.200	0.000	0.000
SUB TOTALS:	**1 009.200**		**1 009.200**	**0.000**	**0.000**
TOTALS:	**1 310.040**		**1 305.040**	**0.000**	**5.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE RUPERT **DISTRICT: KALUM**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	341.100	glyphosate	341.100	0.000	0.000
FOREST CONIFER RELEASE	0.200	glyphosate	0.000	0.200	0.000
FOREST NURSERY FUNGUS CONTROL	0.500	metalaxyl	0.000	0.500	0.000
TOTALS:	**341.800**		**341.100**	**0.700**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE RUPERT **DISTRICT: NORTH COAST**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST SITE REHABILITATION	76.000	glyphosate	0.000	76.000	0.000
SUB TOTALS:	**76.000**		**0.000**	**76.000**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	623.200	glyphosate	37.700	0.000	585.500
FOREST SITE PREPARATION	11.800	glyphosate	11.800	0.000	0.000
SUB TOTALS:	**635.000**		**49.500**	**0.000**	**585.500**
TOTALS:	**711.000**		**49.500**	**76.000**	**585.000**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: PRINCE GEORGE					
B.C. FOREST SERVICE					
FOREST BRUSHING		glyphosate	7 149.600	320.220	0.000
		hexazinone	27.300	0.000	0.000
	7 497.120				
FOREST CONIFER RELEASE		glyphosate	686.400	108.400	227.700
	1 022.500				
FOREST INSECT CONTROL		mineral oil	0.000	0.160	0.000
		MSMA	0.000	0.000	324.593
	324.753				
FOREST RANGE MANAGEMENT		glyphosate	0.000	0.872	0.000
		picloram	0.000	37.051	0.170
	38.093				
FOREST SITE PREPARATION		glyphosate	27.000	0.000	0.000
	27.000				
FOREST SITE REHABILITATION		glyphosate	108.000	0.000	0.000
	108.000				
SUB TOTALS:	**9 017.466**		**7 998.300**	**466.703**	**552.463**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: PRINCE GEORGE FOREST INDUSTRY					
FOREST BRUSHING	9 905.390	glyphosate	9 474.190	365.400	41.500
		hexazinone	0.000	24.300	0.000
FOREST CONIFER RELEASE	4 754.710	glyphosate	4 751.110	3.600	0.000
FOREST INSECT CONTROL	1.770	MSMA	0.000	0.000	1.770
FOREST PRE-HARVEST TREATMENT	1 042.600	glyphosate	0.000	0.000	1 042.600
FOREST RIGHT-OF-WAY MAINTENANCE	130.970	glyphosate	0.000	130.970	0.000
FOREST SITE PREPARATION	2 290.300	glyphosate	2 290.300	0.000	0.000
SUB TOTALS:	**18 125.740**		**16 515.600**	**524.270**	**1 085.870**
TOTALS:	**27 143.206**		**24 513.900**	**990.973**	**1 638.333**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: PRINCE GEORGE**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	1 253.700	glyphosate	1 192.000	61.700	0.000
FOREST CONIFER RELEASE	108.400	glyphosate	0.000	108.400	0.000
FOREST INSECT CONTROL	3.773	MSMA	0.000	0.000	3.773
FOREST RANGE MANAGEMENT	2.000	picloram	0.000	2.000	0.000
FOREST SITE REHABILITATION	108.000	glyphosate	108.000	0.000	0.000
SUB TOTALS:	**1 475.843**		**1 300.000**	**172.100**	**3.773**
FOREST INDUSTRY					
FOREST BRUSHING	6 499.890	glyphosate hexazinone	6 419.090 0.000	15.000 24.300	41.500 0.000
FOREST CONIFER RELEASE	4 268.510	glyphosate	4 264.910	3.600	0.000
FOREST INSECT CONTROL	0.270	MSMA	0.000	0.000	0.270
FOREST RIGHT-OF-WAY MAINTENANCE	130.970	glyphosate	0.000	130.970	0.000
FOREST SITE PREPARATION	2 014.900	glyphosate	2 014.900	0.000	0.000
SUB TOTALS:	**12 914.540**		**12 698.900**	**173.870**	**41.770**
TOTALS:	**14 390.413**		**13 998.900**	**345.970**	**45.543**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: ROBSON VALLEY**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	118.000	MSMA	0.000	0.000	118.000
FOREST RANGE MANAGEMENT	17.660	glyphosate	0.000	0.870	0.000
		picloram	0.000	16.790	0.000
SUB TOTALS:	**135.660**		**0.000**	**17.660**	**118.000**
FOREST INDUSTRY					
FOREST BRUSHING	1 199.700	glyphosate	1 199.700	0.000	0.000
SUB TOTALS:	**1 199.700**		**1 199.700**	**0.000**	**0.000**
TOTALS:	**1 335.360**		**1 199.700**	**17.660**	**118.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: VANDERHOOF**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	465.200	glyphosate	465.200	0.000	0.000
FOREST INSECT CONTROL	0.200	MSMA	0.000	0.000	0.200
SUB TOTALS:	**465.400**		**465.200**	**0.000**	**0.200**
FOREST INDUSTRY					
FOREST BRUSHING	263.900	glyphosate	79.500	184.400	0.000
FOREST PRE-HARVEST TREATMENT	472.600	glyphosate	0.000	0.000	472.600
SUB TOTALS:	**736.500**		**79.500**	**184.400**	**472.600**
TOTALS:	**1 201.900**		**544.700**	**184.400**	**472.800**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: FORT ST. JAMES**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	928.970	glyphosate	846.400	82.570	0.000
FOREST INSECT CONTROL	201.800	MSMA	0.000	0.000	201.800
SUB TOTALS:	**1 130.770**		**846.400**	**82.570**	**201.800**
FOREST INDUSTRY					
FOREST BRUSHING	199.600	glyphosate	124.600	75.000	0.000
FOREST INSECT CONTROL	1.500	MSMA	0.000	0.000	1.500
FOREST PRE-HARVEST TREATMENT	570.000	glyphosate	0.000	0.000	570.000
FOREST SITE PREPARATION	275.400	glyphosate	275.400	0.000	0.000
SUB TOTALS:	**1 046.500**		**400.000**	**75.000**	**571.500**
TOTALS:	**2 177.270**		**1 246.400**	**157.570**	**773.300**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: MACKENZIE**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	0.980	mineral oil MSMA	0.000 0.000	0.160 0.000	0.000 0.820
SUB TOTALS:	**0.980**		**0.000**	**0.160**	**0.820**
FOREST INDUSTRY					
FOREST BRUSHING	592.200	glyphosate	501.200	91.000	0.000
FOREST CONIFER RELEASE	486.200	glyphosate	486.200	0.000	0.000
SUB TOTALS:	**1 078.400**		**987.400**	**91.000**	**0.000**
TOTALS:	**1 079.380**		**987.400**	**91.160**	**0.820**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: DAWSON CREEK**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	2 697.400	glyphosate	2 521.900	175.500	0.000
FOREST RANGE MANAGEMENT	14.933	glyphosate	0.000	0.002	0.000
		picloram	0.000	14.761	0.170
TOTALS:	**2 712.333**		**2 521.900**	**190.263**	**0.170**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: FORT ST. JOHN**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	1 129.650	glyphosate	1 129.200	0.450	0.000
FOREST CONIFER RELEASE	862.100	glyphosate	634.400	0.000	227.700
FOREST RANGE MANAGEMENT	3.500	picloram	0.000	3.500	0.000
FOREST SITE PREPARATION	27.000	glyphosate	27.000	0.000	0.000
SUB TOTALS:	**2 022.250**		**1 790.600**	**3.950**	**227.700**
FOREST INDUSTRY					
FOREST BRUSHING	1 150.100	glyphosate	1 150.100	0.000	0.000
SUB TOTALS:	**1 150.100**		**1 150.100**	**0.000**	**0.000**
TOTALS:	**3 172.350**		**2 940.700**	**3.950**	**227.700**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: PRINCE GEORGE **DISTRICT: FORT NELSON**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING		glyphosate	994.900	0.000	0.000
		hexazinone	27.300	0.000	0.000
	1 022.200				
FOREST CONIFER RELEASE		glyphosate	52.000	0.000	0.000
	52.000				
TOTALS:	**1 074.200**		**1 074.200**	**0.000**	**0.000**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: KAMLOOPS					
B.C. FOREST SERVICE					
FOREST BRUSHING	83.820	glyphosate	11.400	72.420	0.000
FOREST CONIFER RELEASE	170.650	glyphosate	63.900	0.000	106.750
FOREST INSECT CONTROL	89.640	chlorpyrifos	0.000	0.760	0.000
		cyclohexnon	16.000	0.000	0.000
		MSMA	0.000	36.200	0.680
		verbenone	36.000	0.000	0.000
FOREST NURSERY FUNGUS CONTROL	0.770	metalaxyl	0.000	0.770	0.000
FOREST RANGE MANAGEMENT	6 333.680	picloram	0.000	6 333.680	0.000
FOREST WEED SEED TREE CONTROL	199.850	glyphosate	0.000	0.000	199.850
SUB TOTALS:	**6 878.410**		**127.300**	**6 443.830**	**307.280**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: KAMLOOPS FOREST INDUSTRY					
FOREST BRUSHING	362.180	glyphosate picloram	30.000 0.000	211.600 0.000	120.530 0.50
FOREST CONIFER RELEASE	357.300	glyphosate	0.000	357.300	0.000
FOREST CONIFER THINNING	0.999	glyphosate picloram	0.000 0.000	0.000 0.000	0.666 0.333
FOREST INSECT CONTROL	3.950	MSMA	0.000	0.000	3.950
FOREST SITE PREPARATION	376.700	glyphosate	303.200	73.500	0.000
SUB TOTALS:	**1 101.129**		**333.200**	**642.400**	**125.529**
TOTALS:	**7 979.539**		**460.500**	**7 086.230**	**432.809**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: CLEARWATER**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	0.720	glyphosate	0.000	0.720	0.000
FOREST INSECT CONTROL	0.500	MSMA	0.000	0.000	0.500
FOREST RANGE MANAGEMENT	18.600	picloram	0.000	18.600	0.000
TOTALS:	**19.820**		**0.000**	**19.320**	**0.500**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: KAMLOOPS**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	36.940	chlorpyrifos	0.000	0.760	0.000
		MSMA	0.000	0.000	0.180
		verbenone	36.000	0.000	0.000
FOREST RANGE MANAGEMENT	456.500	picloram	0.000	456.500	0.000
FOREST WEED SEED TREE CONTROL	168.750	glyphosate	0.000	0.000	168.750
TOTALS:	**662.190**		**36.000**	**457.260**	**168.930**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: SALMON ARM**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST NURSERY FUNGUS CONTROL	0.660	metalaxyl	0.000	0.660	0.000
FOREST RANGE MANAGEMENT	6.900	picloram	0.000	6.900	0.000
SUB TOTALS:	7.560		0.000	7.560	0.000
FOREST INDUSTRY					
FOREST CONIFER RELEASE	73.200	glyphosate	0.000	73.200	0.000
FOREST SITE PREPARATION	334.200	glyphosate	303.200	31.000	0.000
SUB TOTALS:	**407.400**		**303.200**	**104.200**	**0.000**
TOTALS:	**414.960**		**303.200**	**111.760**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: VERNON**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	71.700	glyphosate	0.000	71.700	0.000
FOREST CONIFER RELEASE	0.500	glyphosate	0.000	0.000	0.500
FOREST NURSERY FUNGUS	0.110	metalaxyl	0.000	0.110	0.000
FOREST RANGE MANAGEMENT	5 531.680	picloram	0.000	5 531.680	0.000
SUB TOTALS:	**5 603.990**		**0.000**	**5 603.490**	**0.500**
FOREST INDUSTRY					
FOREST BRUSHING	95.400	glyphosate	0.000	95.400	0.000
FOREST CONIFER RELEASE	284.100	glyphosate	0.000	284.100	0.000
FOREST SITE PREPARATION	42.500	glyphosate	0.000	42.500	0.000
SUB TOTALS:	**422.000**		**0.000**	**422.000**	**0.000**
TOTALS:	**6 025.990**		**0.000**	**6 025.490**	**0.500**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: PENTICTON**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST CONIFER RELEASE	106.250	glyphosate	0.000	0.000	106.250
SUB TOTALS:	**106.250**		**0.000**	**0.000**	**106.250**
FOREST INDUSTRY					
FOREST BRUSHING	0.080	glyphosate	0.000	0.000	0.030
		picloram	0.000	0.000	0.050
FOREST CONIFER THINNING	0.999	glyphosate	0.000	0.000	0.666
		picloram	0.000	0.000	0.333
FOREST INSECT CONTROL	3.950	MSMA	0.000	0.000	3.950
SUB TOTALS:	**5.029**		**0.000**	**0.000**	**5.029**
TOTALS:	**111.279**		**0.000**	**0.000**	**111.279**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: MERRITT**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	36.200	MSMA	0.000	36.200	0.000
FOREST RANGE MANAGEMENT	320.000	picloram	0.000	320.000	0.000
FOREST WEED SEED TREE CONTROL	31.100	glyphosate	0.000	0.000	31.100
SUB TOTALS:	**387.300**		**0.000**	**356.200**	**31.100**
FOREST INDUSTRY					
FOREST BRUSHING	236.700	glyphosate	0.000	116.200	120.500
SUB TOTALS:	**236.700**		**0.000**	**116.200**	**120.500**
TOTALS:	**624.000**		**0.000**	**472.400**	**151.600**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: KAMLOOPS **DISTRICT: LILLOOET**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	11.400	glyphosate	11.400	0.000	0.000
FOREST CONIFER RELEASE	63.900	glyphosate	63.900	0.000	0.000
FOREST INSECT CONTROL	16.000	cyclohexnon	16.000	0.000	0.000
SUB TOTALS:	**91.300**		**91.300**	**0.000**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	30.000	glyphosate	30.000	0.000	0.000
SUB TOTALS:	**30.000**		**30.000**	**0.000**	**0.000**
TOTALS:	**121.300**		**121.300**	**0.000**	**0.000**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: NELSON					
B.C. FOREST SERVICE					
FOREST INSECT CONTROL	33.470	MSMA	0.000	0.000	33.470
FOREST NURSERY FUNGUS CONTROL	0.600	metalaxyl	0.000	0.600	0.000
FOREST PRE-HARVEST TREATMENT	67.300	glyphosate	0.000	0.000	67.300
FOREST RANGE MANAGEMENT	93.891	glyphosate picloram	0.000 0.000	2.000 91.891	0.000 0.000
SUB TOTALS:	**195.261**		**0.000**	**94.491**	**100.770**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: NELSON FOREST INDUSTRY					
FOREST PRE-HARVEST TREATMENT	99.750	glyphosate	0.000	0.000	99.750
FOREST SITE PREPARATION	424.880	glyphosate	415.630	9.250	0.000
SUB TOTALS:	**524.630**		**415.630**	**9.250**	**99.750**
TOTALS:	**719.891**		**415.630**	**103.741**	**200.520**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: NELSON **DISTRICT: CRANBROOK**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST RANGE MANAGEMENT	21.400	picloram	0.000	21.400	0.000
TOTALS:	**21.400**		**0.000**	**21.400**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: NELSON **DISTRICT: INVERMERE**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	33.150	MSMA	0.000	0.000	33.150
FOREST RANGE MANAGEMENT	10.441	picloram	0.000	10.441	0.000
TOTALS:	**43.591**		**0.000**	**10.441**	**33.150**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: NELSON **DISTRICT: GOLDEN**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INDUSTRY					
FOREST SITE PREPARATION	424.880	glyphosate	415.630	9.250	0.000
TOTALS:	**424.880**		**415.630**	**9.250**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: NELSON **DISTRICT: BOUNDARY**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	0.320	MSMA	0.000	0.000	0.320
FOREST PRE-HARVEST TREATMENT	67.300	glyphosate	0.000	0.000	67.300
FOREST RANGE MANAGEMENT	62.050	glyphosate picloram	0.000 0.000	2.000 60.050	0.000 0.000
SUB TOTALS:	**129.670**		**0.000**	**62.050**	**67.620**
FOREST INDUSTRY					
FOREST PRE-HARVEST TREATMENT	99.750	glyphosate	0.000	0.000	99.750
SUB TOTALS:	**99.750**		**0.000**	**0.000**	**99.750**
TOTALS:	**229.420**		**0.000**	**62.050**	**167.370**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: CARIBOO					
B.C. FOREST SERVICE					
FOREST BRUSHING	614.000	glyphosate	372.000	242.000	0.000
FOREST CONIFER RELEASE	652.500	glyphosate	524.300	128.200	0.000
FOREST INSECT CONTROL	0.510	MSMA	0.000	0.000	0.510
FOREST NURSERY FUNGUS CONTROL	0.500	metalaxyl	0.000	0.500	0.000
SUB TOTALS:	**1 267.510**		**896.300**	**370.700**	**0.510**

REGIONAL SUMMARY OF PESTICIDE USE, 1990
BCFS AND FOREST INDUSTRY

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
REGION: CARIBOO FOREST INDUSTRY					
FOREST BRUSHING	1 723.265	glyphosate	1 643.465	64.000	0.000
		hexazinone	0.000	15.800	0.000
FOREST CONIFER RELEASE	1 963.200	glyphosate	1 816.300	0.000	0.000
		hexazinone	0.000	146.900	0.000
FOREST SITE PREPARATION	138.300	glyphosate	0.000	44.500	0.000
		hexazinone	0.000	93.800	0.000
SUB TOTALS:	**3 824.765**		**3 459.765**	**365.000**	**0.000**
TOTALS:	**5 092.275**		**4 356.065**	**735.700**	**0.510**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: CARIBOO **DISTRICT: QUESNEL**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST BRUSHING	614.000	glyphosate	372.000	242.000	0.000
FOREST CONIFER RELEASE	652.500	glyphosate	524.300	128.200	0.000
FOREST NURSERY FUNGUS CONTROL	0.500	metalaxyl	0.000	0.500	0.000
SUB TOTALS:	**1 267.000**		**896.300**	**370.700**	**0.000**
FOREST INDUSTRY					
FOREST BRUSHING	1 659.265	glyphosate	1 643.465	0.000	0.000
		hexazinone	0.000	15.800	0.000
FOREST CONIFER RELEASE	1 963.200	glyphosate	1 816.300	0.000	0.000
		hexazinone	0.000	146.900	0.000
FOREST SITE PREPARATION	138.300	glyphosate	0.000	44.500	0.000
		hexazinone	0.000	93.800	0.000
SUB TOTALS:	**3 760.765**		**3 459.765**	**301.000**	**0.000**
TOTALS:	**5 027.765**		**4 356.065**	**671.700**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: CARIBOO **DISTRICT: 100 MILE HOUSE**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INDUSTRY					
FOREST BRUSHING	64.000	glyphosate	0.000	64.000	0.000
TOTALS:	**64.000**		**0.000**	**64.000**	**0.000**

SUMMARY OF PESTICIDE USE BY FOREST REGION AND DISTRICT, 1990
BCFS AND FOREST INDUSTRY

REGION: CARIBOO **DISTRICT: CHILCOTIN**

PURPOSE	TOTAL ha TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
B.C.F.S.					
FOREST INSECT CONTROL	0.510	MSMA	0.000	0.000	0.510
TOTALS:	**0.510**		**0.000**	**0.000**	**0.510**

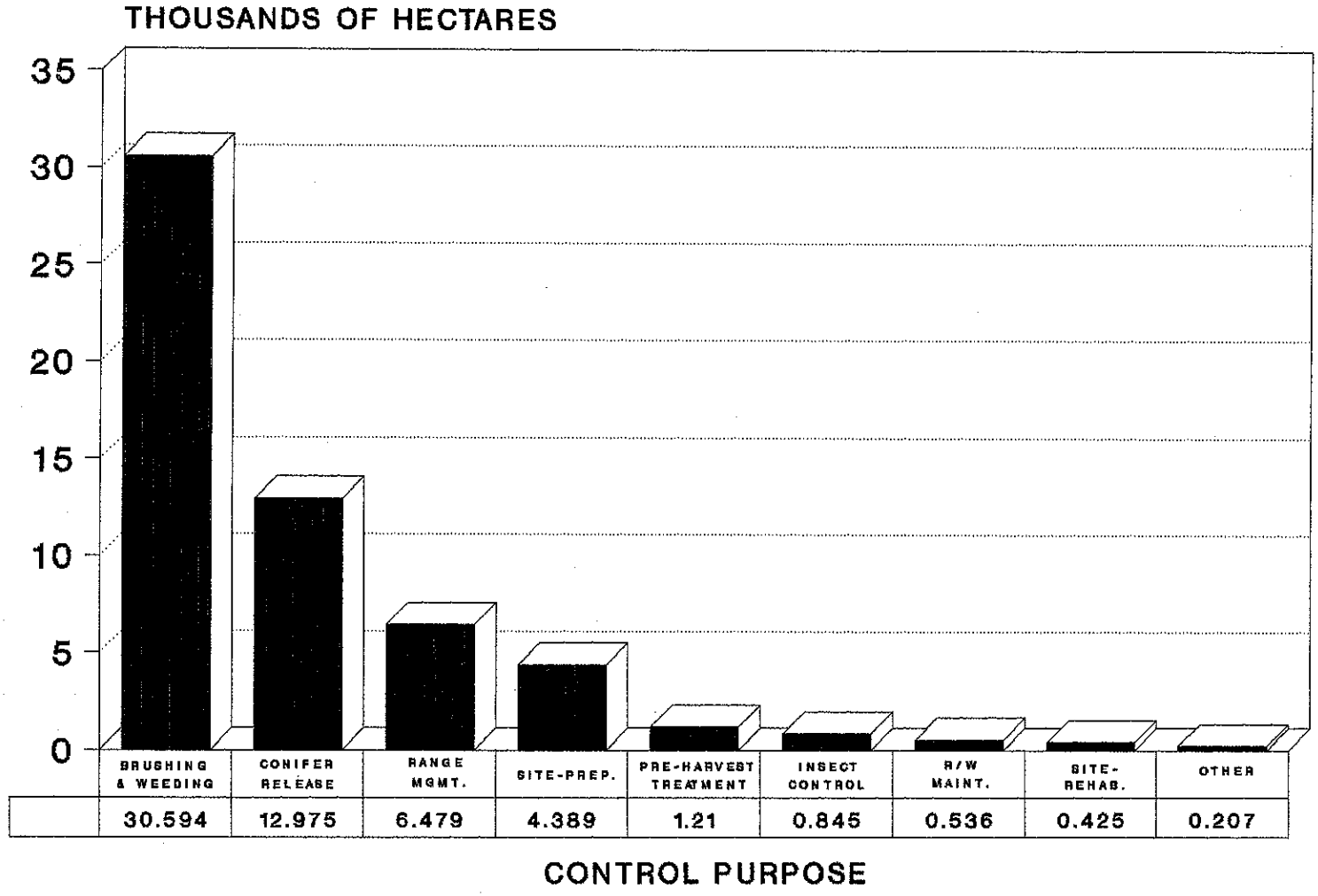
TABLE VII Cont.
PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL PURPOSE, 1990

PURPOSE	PESTICIDE	B.C. FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
FOREST PRE-HARVEST TREATMENT	glyphosate	67.300	1 142.350
TOTAL ha.:	**1 209.650**		
FOREST RANGE MANAGEMENT	glyphosate	2.992	0.000
	picloram	6 476.172	0.000
TOTAL ha.:	**6 479.164**		
FOREST RIGHT-OF-WAY MAINTENANCE	2, 4-D amine	0.000	29.000
	2, 4-D ester	0.000	24.000
	glyphosate	0.000	483.320
TOTAL ha.:	**536.320**		
FOREST SEED AND CONE INSECT CONTROL	acephate	0.012	0.000
	oxydemeton	0.012	0.000
TOTAL ha.:	**0.024**		
FOREST SITE PREPARATION	glyphosate	166.600	4 128.910
	hexazinone	0.000	93.800
TOTAL ha.:	**4 389.310**		
FOREST SITE REHABILITATION	glyphosate	425.500	0.000
TOTAL ha.:	**425.500**		
FOREST VERTEBRATE CONTROL	diphacinone	0.000	0.044
	putrid eggs	0.000	0.800
TOTAL ha.:	**0.844**		
FOREST WEED SEED TREE CONTROL	glyphosate	199.850	0.000
TOTAL ha.:	**199.850**		
GRAND TOTALS:		***21 058.436***	***36 603.086***

TABLE VII Cont.
PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL PURPOSE, 1990

PURPOSE	PESTICIDE	B.C. FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
FOREST PRE-HARVEST TREATMENT	glyphosate	67.300	1 142.350
TOTAL ha.:	**1 209.650**		
FOREST RANGE MANAGEMENT	glyphosate	2.992	0.000
	picloram	6 476.172	0.000
TOTAL ha.:	**6 479.164**		
FOREST RIGHT-OF-WAY MAINTENANCE	2, 4-D amine	0.000	29.000
	2, 4-D ester	0.000	24.000
	glyphosate	0.000	483.320
TOTAL ha.:	**536.320**		
FOREST SEED AND CONE INSECT CONTROL	acephate	0.012	0.000
	oxydemeton	0.012	0.000
TOTAL ha.:	**0.024**		
FOREST SITE PREPARATION	glyphosate	166.600	4 128.910
	hexazinone	0.000	93.800
TOTAL ha.:	**4 389.310**		
FOREST SITE REHABILITATION	glyphosate	425.500	0.000
TOTAL ha.:	**425.500**		
FOREST VERTEBRATE CONTROL	diphacinone	0.000	0.044
	putrid eggs	0.000	0.800
TOTAL ha.:	**0.844**		
FOREST WEED SEED TREE CONTROL	glyphosate	199.850	0.000
TOTAL ha.:	**199.850**		
GRAND TOTALS:		***21 058.436***	***36 603.086***

PROVINCIAL SUMMARY OF AREA (ha) TREATED WITH PESTICIDES BY CONTROL PURPOSE, 1990 [1]



[1] B.C. Forest Service & Industry Combined

TABLE VIII
PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL METHOD, 1990

METHOD	PESTICIDE	B.C. FOREST SERVICE ha TREATED	FOREST INDUSTRY ha TREATED
VEHICLE MOUNTED SPRAY BOOM	glyphosate	98.070	379.270
	hexazinone	0.000	93.800
	metalaxyl	2.260	0.000
	picloram	6 094.020	0.000
	trademefon	0.350	0.000
TOTAL ha.:	**6 667.770**		
BACK PACK SPRAYER AND HAND HELD SPRAY EQUIPMENT[1]	2, 4-D amine		29.000
	carbaryl	0.840	0.000
	chlorpyrifos	0.760	0.000
	glyphosate	1 181.8801	1 688.800
	hexazinone	0.000	154.400
	metalaxyl	0.110	0.000
	mineral oil	0.160	0.000
	MSMA	36.200	1.300
	picloram	2.000	0.000
	triclopyr	0.100	0.000
TOTAL ha.:	**3 095.550**		
VEHICLE MOUNTED SPRAY NOZZLES	2, 4-D ester	0.000	24.000
	acephate	0.012	0.000
	glyphosate	221.322	606.880
	hexazinone	0.000	32.600
	oxydemeton	0.012	0.000
	picloram	379.982	0.000
	pirmicarb	0.005	0.000
TOTAL ha.:	**1 264.813**		
HAND BROADCAST	diphacinone	0.000	0.044
TOTAL ha.:	**0.044**		

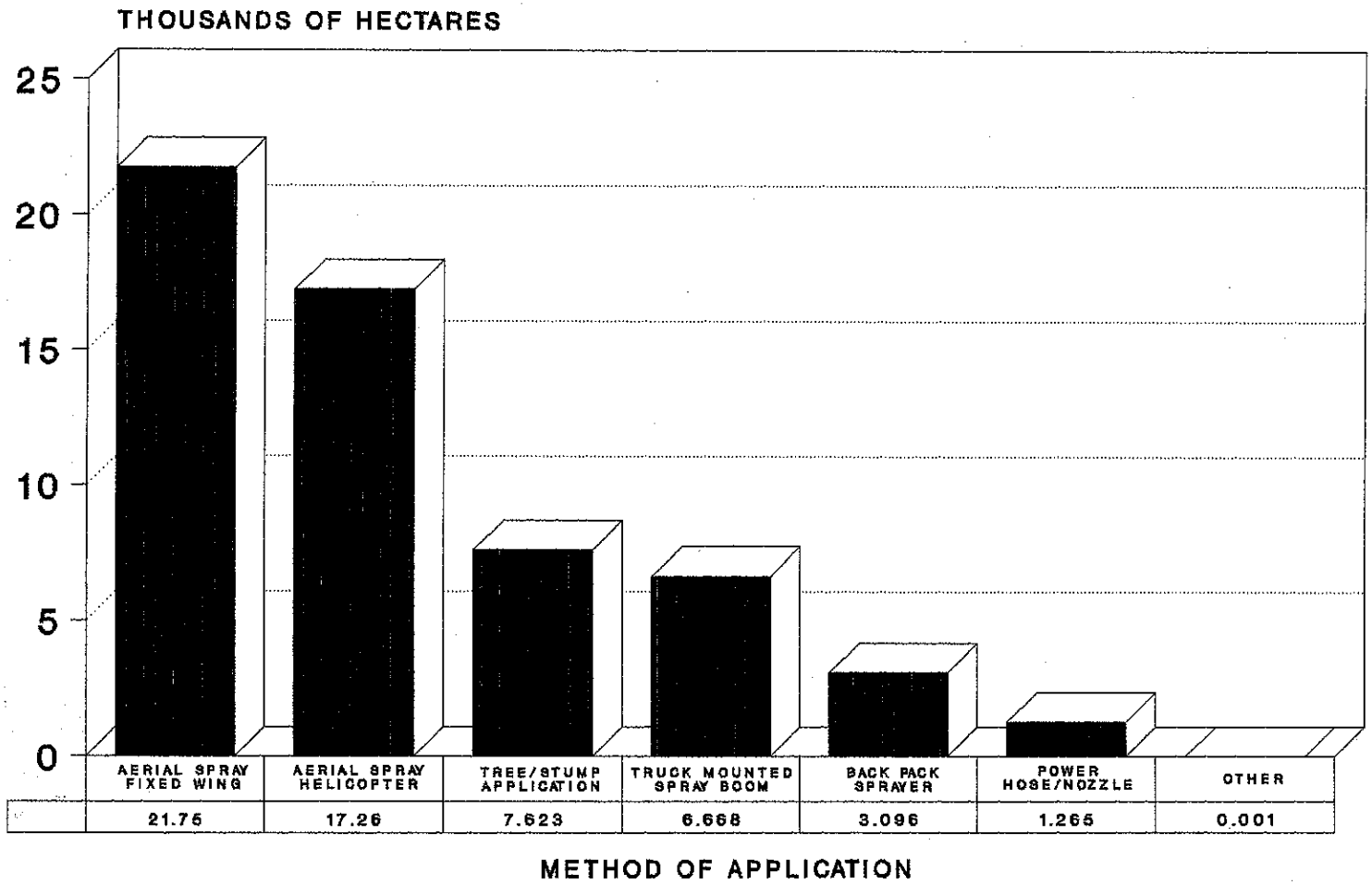
TABLE VIII Cont.
PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL METHOD, 1990

METHOD	PESTICIDE	B.C. FOREST SERVICE ha TREATED	FOREST INDUSTRY ha TREATED
TREE INJECTION/ CUT SURFACE TREATMENT[2]	2, 4-D amine	0.000	60.000
	acephate	0.000	0.050
	glyphosate	993.250	3 384.184
	MSMA	387.713	5.720
	picloram	0.000	0.393
TOTAL ha.:	**4 831.310**		
STUMP APPLICATION	2, 4-D amine	90.800	848.000
	glyphosate	367.550	1 484.900
	picloram	0.170	0.000
TOTAL ha.:	**2 791.420**		
AERIAL FIXED WING	B.t.k.	0.000	360.000
	cyclohexnon	16.000	0.000
	glyphosate	4 312.700	17 033.930
	hexazinone	27.300	0.000
TOTAL ha.:	**21 749.930**		
AERIAL HELICOPTER	glyphosate	6 808.870	10 415.015
	verbenone	36.000	0.000
TOTAL ha.:	**17 259.885**		
OTHER	putrid eggs	0.000	0.800
TOTAL ha.:	**0.800**		
GRAND TOTALS:		***21 058.436***	***36 603.086***

[1]Includes mistblowers, ultra low volume sprayers, spot guns and granule spreaders.

[2]Involves hack and squirt, frill and squirt, and cut stump treatments. Includes brush saws, lance injectors and hypo hatchets.

PROVINCIAL SUMMARY OF AREA (ha) TREATED
WITH PESTICIDES BY METHOD OF APPLICATION
1990 [1]



[1] B.C. Forest Service & Industry Combined

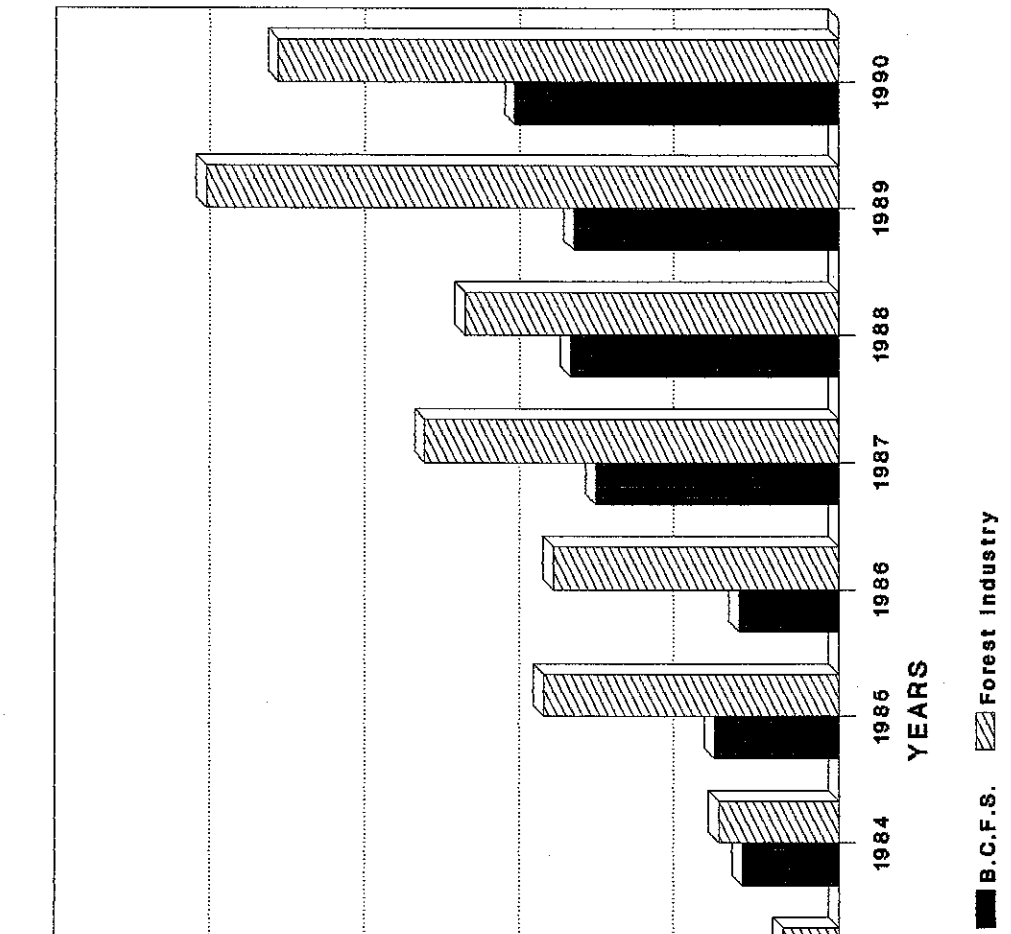
TABLE IX
TOTAL AREA (ha) TREATED WITH HERBICIDES AND INSECTICIDES FOR FORESTRY PURPOSES, 1980 - 1990

YEAR	B.C. FOREST SERVICE		FOREST INDUSTRY		TOTALS	
	HERB.	INSECT.	HERB.	INSECT.	HERB.	INSECT.
1980	1 614.0	1.0	3 412.0	70.0	5 026.0	71.0
1981	2 361.0	134.0	4 232.0	0.4	6 593.0	134.0
1982	2 630.0	786.0	1 636.0	0.1[1]	4 266.0	786.0
1983	2 586.0	807.0	3 595.0	5.0	6 181.0	812.0
1984	6 184.0	199.0	7 709.0	33.0	13 893.0	232.0
1985	8 018.0	612.0	19 133.0	26.0	27 151.0	638.0
1986	6 434.0	162.0	18 487.0	200.0	24 921.0	362.0
1987	15 705.0	1 035.0[2]	26 791.0	282.0	42 496.0	1 317.0
1988	17 378.0	1 876.0	24 224.0	270.0	41 602.0	2 146.0
1989	17 201.9	566.03	40 901.13	734.4	58 103.03	1 300.43
1990	20 575.01	478.0	36 235.2	367.1	56 810.2	845.1

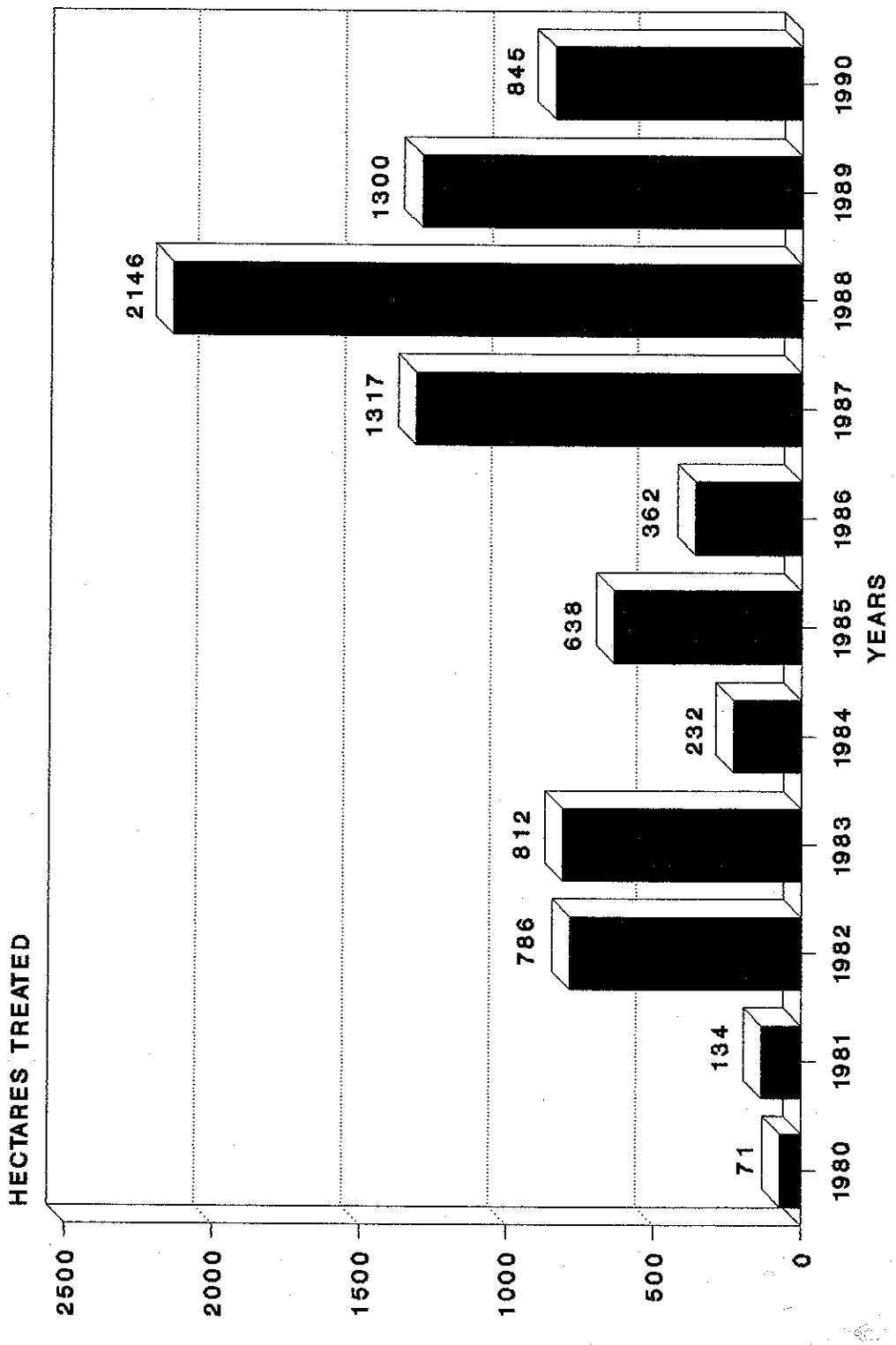
[1]Area treated was less than 0.1 ha.

[2]Insecticide figures for 1987 have been revised.

AREA TREATED WITH HERBICIDES
FOR FORESTRY PURPOSES 1980-1990



AREA TREATED WITH INSECTICIDES
FOR FORESTRY PURPOSES 1980-1990 [1]



[1] B.C. Forest Service & Industry Combined

DISCUSSIONS AND CONCLUSIONS

Pesticides were applied to 57 662 ha of B.C. forest and rangeland in 1990, approximately the same level of use as 1989 (59 425 ha). Forest companies were responsible for 64% of the total area treated and the Forest Service for 36%, as compared to 70% and 30%, respectively, in 1989.

Glyphosate was applied to over 80% of the provincial area treated with pesticides in 1990 and 1989. The use of 2,4-D has declined from 3 346 ha treated in 1989 to 1 052 ha in 1990.

Hebicide applications for the purpose of controlling unwanted vegetation remained at the same levels as 1989.

Helicopters and fixed-wing aircraft were used to apply pesticides to approximately 68% of the total provincial area treated in both 1989 and 1990.

ACKNOWLEDGEMENTS

The author would like to thank the Ministry of Environment, Pesticide Control Branch for its ongoing cooperation in providing this data.