

**PESTICIDE USE
IN BRITISH COLUMBIA FORESTRY**

1991

by

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FOREWORD

A continuing series of internal reports on pesticide use in British Columbia forestry was initiated in the early 1980's. At that time the Ministry of Forests (Protection Branch), the Council of Forest Industries of British Columbia and the Ministry of Environment (Pesticide Control Branch) began a cooperative project to collect data on forestry 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 Management Branch, and represents only those permits that were active in 1991. 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 1981-1991.

INTRODUCTION

This report is part of a continuing series that began in the early 1980's. At that time a cooperative project was initiated by the Ministry of Forests (Protection Branch), the Council of Forest Industries of British Columbia, and the 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:^{1,2}

1. Numbers of 1991 forestry permit applications submitted; denied; cancelled and appealed.
2. Environmental Appeal Board decisions on all appealed permits.
3. Provincial 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 general 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, 1981-1991.

The above information is also summarized by the user - i.e., British Columbia Forest Service or forest industry.

¹ This report was based on all follow-up reports received by May 92.

² 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 reflect permits that were used to apply pesticides in several regions.

RESULTS OF THE 1992 SURVEY

Pesticide Control Branch reviewed 477 forestry pesticide use applications in 1991 and issued 461 permits (Table I).

Twenty permits were appealed in 1991 and Environmental Appeal Board decisions were as follows: nine supported, nine amended, and two cancelled or revoked (Table II).

A total of 43 374 hectares (ha) of British Columbia forest and range (Crown) land were treated with pesticides in 1991. The British Columbia Forest Service applied pesticides to 18 671 ha (43%) and forest industry to 24 702 ha (57%).

The herbicide, glyphosate, and the biological insecticide, *Bacillus thuringiensis* Berliner var. *kurstaki* (*B.t.k.*) were the most widely used products in terms of area treated. Glyphosate was applied to 37 098 ha, 86% of the total area treated in the province in 1991, and *B.t.k.* to 3 733 ha. These were followed by MSMA (1 283 ha), picloram (552 ha) and 2,4-D (281 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 12-82.

The majority of pesticide applications occurred in the Prince George Forest Region (20 360 ha), followed by Vancouver (8 468 ha), Kamloops (6 258 ha) and Prince Rupert (2 480 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 31 053 ha for brushing and conifer release operations and to 4 612 ha to prepare harvested sites for planting. Forest right-of-way maintenance and site rehabilitation treatments were conducted on 922 ha, and 496 ha, respectively. Herbicides were also applied to 710 ha for range land management (noxious weed control). Insecticides were applied to 5 269 ha (Table VII, Figure 4).

Pesticides were aerially applied to 32 635 ha of forest land. Of this, 18 509 ha were treated by helicopter and 14 126 ha by fixed-wing aircraft. Tree injection application methods were used over 5 557 ha, while backpack sprayers and vehicle mounted sprayers were used to apply pesticides to 4 352 ha (Table VIII, Figure 5).

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

	BC FOREST SERVICE	FOREST INDUSTRY	TOTAL
APPLICATIONS SUBMITTED	177	300	477
APPLICATIONS WITHDRAWN OR DENIED	3	13	16
PERMITS ISSUED (TOTAL)	174	287	461
PERMITS CANCELLED REVOKED OR SUSPENDED BY THE PESTICIDE CONTROL BRANCH	52	74	126

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

	BC FOREST SERVICE	FOREST INDUSTRY	TOTAL
PERMITS APPEALED	5	15	20
APPEALED PERMITS CANCELLED/REVOKED	0	2	2
APPEALED PERMITS AMENDED	5	4	9
APPEALED PERMITS SUPPORTED	0	9	9
HEARINGS OR DECISIONS PENDING	0	0	0

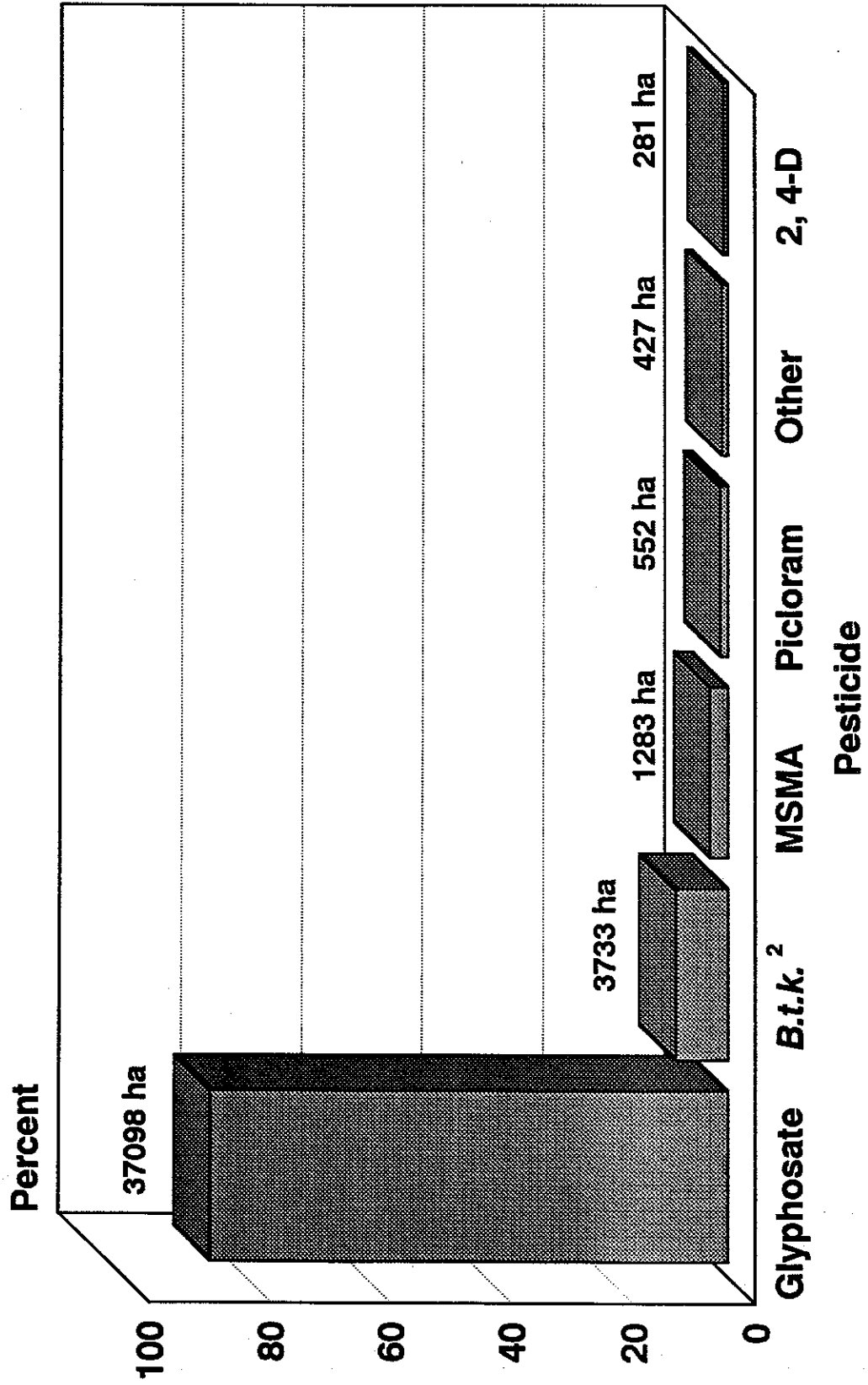
*permits extended one year by the Appeal Board are not considered to be amended

TABLE III
PROVINCIAL SUMMARY OF AREA (ha)
TREATED AND ACTIVE INGREDIENT (kg a.i.) USED
BY PESTICIDE, 1991

PESTICIDE	BC FOREST SERVICE		FOREST INDUSTRY	
	ha treated	kg a.i. applied	ha treated	kg a.i. applied
1,3-dichloro	0.000	0.000	0.478	191.760
2,4-D	92.050	368.675	189.010	148.850
<i>B.t.k.</i>	3,733.000	10,228.000	0.000	0.000
carbaryl	3.260	8.640	0.000	0.000
dicamba	1.250	3.900	0.000	0.000
dimethoate	0.150	0.294	0.000	0.000
glyphosate	13,553.543	21,488.990	23,544.640	36,671.786
hexazinone	0.000	0.000	7.400	89.000
mineral oil	0.050	9.000	0.000	0.000
MSMA	519.110	970.350	763.660	30.760
Na Meta	0.000	0.000	0.500	50.000
NPV	200.000	2.181	0.000	0.000
oxydemeton	0.150	0.294	0.000	0.000
permethrin	0.022	0.009	0.000	0.000
picloram	482.023	288.365	69.650	4.901
triclopyr	0.000	0.000	125.110	67.132
verbenone	86.680	8.920	2.500	0.420

Pesticide Use

In Percent (ha) Treated, 1991¹

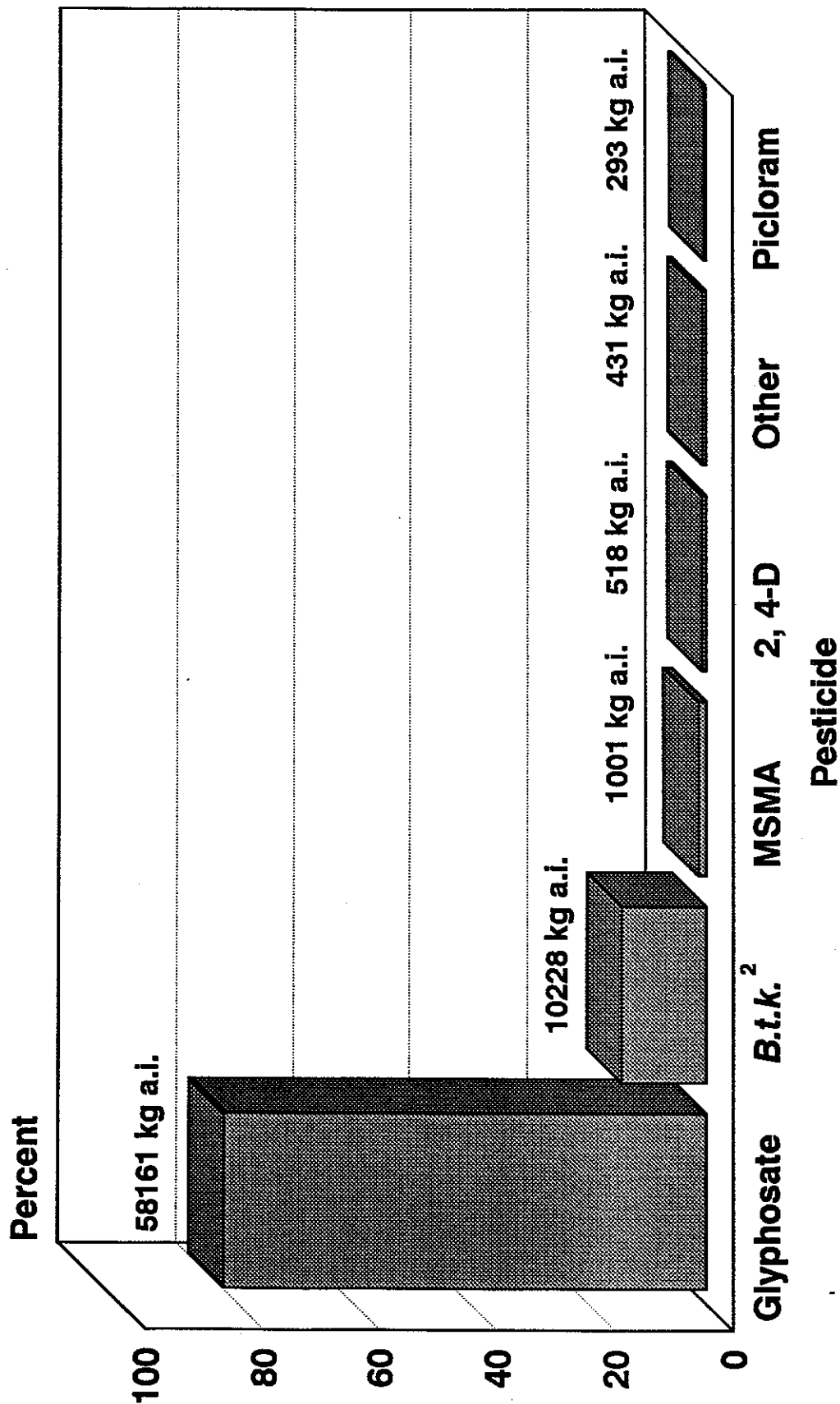


¹ B.C. Forest Service & Industry Combined

² *Bacillus thuringiensis* var. *kurstaki*

Pesticide Use

In Percent Active Ingredient (kg a.i.) Applied, 1991¹



¹ B.C. Forest Service & Industry Combined

² *Bacillus thuringiensis* var. *kurstaki*

TABLE IV
REGIONAL SUMMARY OF AREA (ha) TREATED
BY PESTICIDE, 1991
BCFS AND FOREST INDUSTRY

FOREST REGION	glyphosate	2, 4-D	hexazinone	picloram	<i>B.t.k.</i>	Others	Totals
VANCOUVER	8,153.390	189.010	0.000	0.000	0.000	125.600	8,468.000
PRINCE RUPERT	2,470.870	0.000	0.000	0.000	0.000	8.710	2,479.580
PRINCE GEORGE	19,464.060	0.000	0.000	113.828	553.00	229.330	20,360.218
KAMLOOPS	1,623.310	0.000	0.000	347.510	3,180.000	1,107.010	6,257.830
NELSON	813.910	0.000	0.000	90.335	0.000	212.300	1,116.545
CARIBOO	2,163.820	0.000	7.400	0.000	0.000	4.550	2,175.770
TOTALS:	34,689.360	189.010	7.400	551.673	3,733.000	1,687.500	40,857.943
(%)	84.90	0.46	0.02	1.35	9.14	4.13	100.00

TABLE V

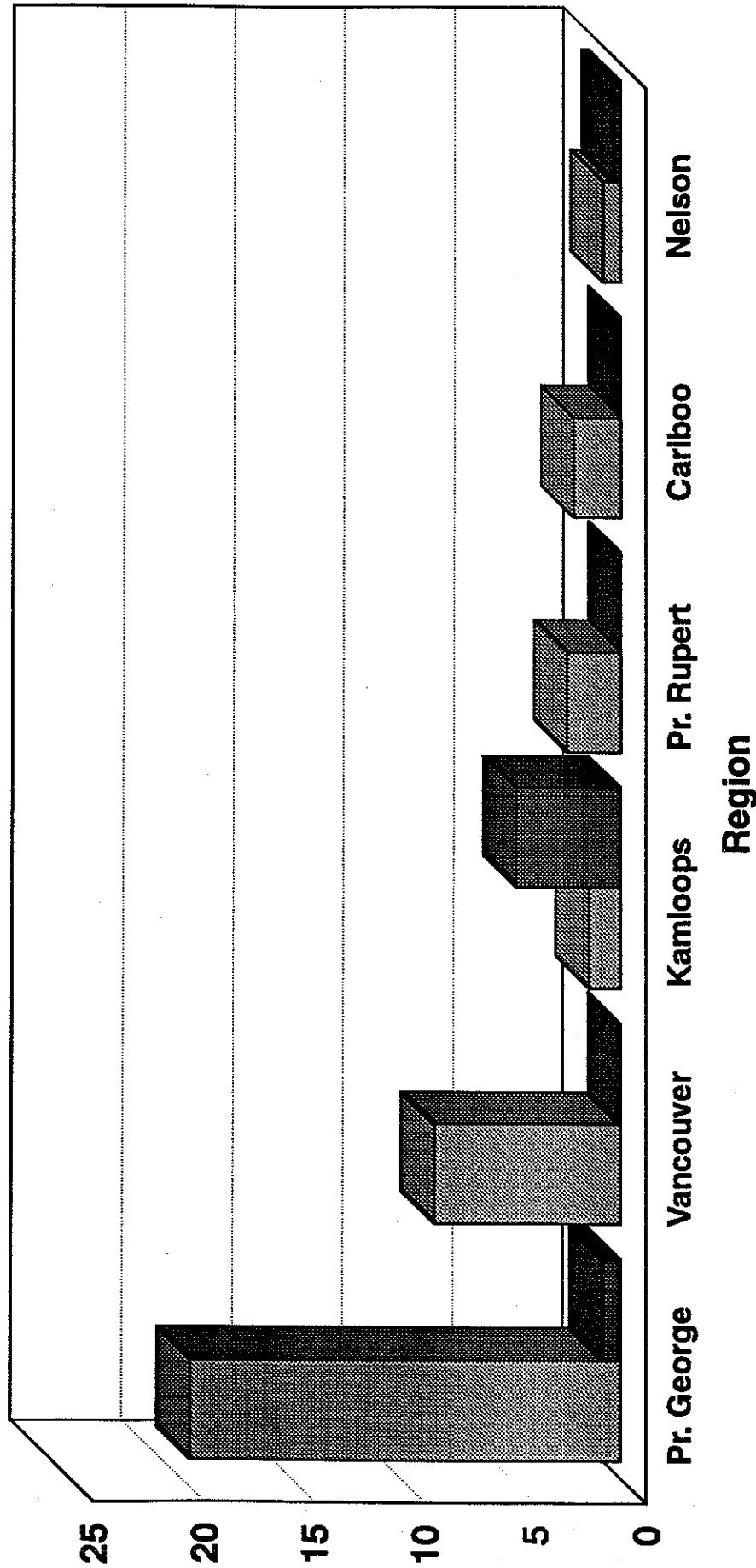
REGIONAL SUMMARY OF AREA (ha)
TREATED BY CONTROL PURPOSE, 1991
BCFS AND FOREST INDUSTRY

FOREST REGION	VEGETATION MANAGEMENT	INSECT MANAGEMENT	RANGE MANAGEMENT	TOTALS
VANCOUVER	8,468.000	0.000	0.000	8,468.000
PRINCE RUPERT	2,470.870	8.710	0.000	2,479.580
PRINCE GEORGE	19,519.670	779.830	60.718	20,360.218
KAMLOOPS	1,461.520	4,249.840	546.470	6,257.830
NELSON	806.090	212.300	98.155	1,116.545
CARIBOO	2,168.500	4.550	2.720	2,175.770
TOTALS:	34,894.650	5,255.230	708.063	40,857.943
(%)	85.40	12.86	1.73	100.00

Area Treated with Pesticides

Provincial Summary by Forest Region, 1991¹

Thousands of Hectares



■ Vegetation Mgmt. ■ Insect, Range & Other

¹ B.C. Forest Service & Industry Combined

TABLE VI
REGIONAL SUMMARY OF AREA (ha)
TREATED BY METHOD OF APPLICATION, 1991
BCFS AND FOREST INDUSTRY

FOREST REGION	AERIAL SPRAY	GROUND APPLICATION	STEM INJECTION	TOTALS
VANCOUVER	2,946.150	2,556.890	2,964.960	8,468.000
PRINCE RUPERT	1,878.100	593.270	8.210	2,479.580
PRINCE GEORGE	19,428.620	618.968	312.630	20,360.218
KAMLOOPS	3,792.410	977.880	1,487.540	6,257.830
NELSON	767.490	136.755	212.300	1,116.545
CARIBOO	2,149.600	21.620	4.550	2,175.770
TOTALS:	30,962.370	4,905.383	4,990.190	40,857.943
(%)	75.78	12.01	12.21	100.00

REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY

REGION: VANCOUVER

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	4,503.670	2, 4-D amine	0.000	74.00	30.010
		glyphosate	1,394.850	504.030	2,500.280
		Na Meta	0.000	0.500	0.000
FOREST CONIFER RELEASE	615.610	2, 4-D amine	0.000	0.000	70.000
		glyphosate	223.000	247.900	35.310
		triclopyr	0.000	39.400	0.000
FOREST PRE-HARVEST TREATMENT	7.500	glyphosate	0.000	7.500	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	654.800	2, 4-D amine	0.000	15.000	0.000
		glyphosate	0.000	639.800	0.000
FOREST SITE PREPARATION	246.400	glyphosate	75.000	85.700	0.000
		triclopyr	0.000	85.700	0.000
REGION TOTALS:	6,027.980		1,692.850	1,699.530	2,635.600

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: VANCOUVER

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	911.060	glyphosate	725.100	185.960	0.000
FOREST CONIFER RELEASE	955.760	glyphosate	0.000	626.400	329.360
FOREST SITE PREPARATION	388.600	glyphosate	388.600	0.000	0.000
FOREST SITE REHABILITATION	184.600	glyphosate	139.600	45.000	0.000
REGION TOTALS:	2,440.020		1,253.300	857.360	329.360

**REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY**

REGION: PRINCE RUPERT

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	534.970	glyphosate	473.000	61.970	0.000
FOREST CONIFER RELEASE	723.800	glyphosate	647.100	76.700	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	194.800	glyphosate	0.000	194.800	0.000
FOREST SITE PREPARATION	77.200	glyphosate	77.200	0.000	0.000
REGION TOTALS:	1,530.770		1,197.300	333.470	0.000

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: PRINCE RUPERT

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	555.100	glyphosate	439.300	115.800	0.000
FOREST CONIFER RELEASE	241.500	glyphosate	241.500	0.000	0.000
FOREST INSECT CONTROL	8.710	carbaryl	0.000	0.500	0.000
		MSMA	0.000	0.000	8.210
FOREST SITE PREPARATION	103.000	glyphosate	0.000	103.000	0.000
FOREST SITE REHABILITATION	40.500	glyphosate	0.000	40.500	0.000
REGION TOTALS:	948.810		680.800	259.800	8.210

REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY

REGION: PRINCE GEORGE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	7,265.020	glyphosate	7,145.020	120.000	0.000
FOREST CONIFER RELEASE	2,964.880	glyphosate	2,964.880	0.000	0.000
FOREST INSECT CONTROL	3.330	MSMA	0.000	0.000	3.330
FOREST PRE-HARVEST TREATMENT	75.800	glyphosate	0.000	0.000	75.800
FOREST RIGHT-OF-WAY MAINTENANCE	69.450	picloram	0.000	69.450	0.000
FOREST SITE PREPARATION	1,433.120	glyphosate	1,433.120	0.000	0.000
REGION TOTALS:	11,811.600		11,543.020	189.450	79.130

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: PRINCE GEORGE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	5,036.420	glyphosate	4,925.020	111.400	0.000
FOREST CONIFER RELEASE	944.700	glyphosate	691.800	252.900	0.000
FOREST INSECT CONTROL	776.500	<i>B.t.k.</i>	553.000	0.000	0.000
		MSMA	0.000	0.000	223.500
FOREST RANGE MANAGEMENT	60.718	glyphosate	0.000	16.340	0.000
		picloram	0.000	34.378	10.000
FOREST RIGHT-OF-WAY MAINTENANCE	2.500	2,4-D	0.000	1.250	0.000
		dicamba	0.000	1.250	0.000
FOREST SITE PREPARATION	1,727.780	glyphosate	1,715.780	12.000	0.000
REGION TOTALS:	8,548.618		7,885.600	429.518	233.500

**REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY**

REGION: KAMLOOPS

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	284.900	glyphosate	180.500	104.400	0.000
FOREST CONIFER RELEASE	130.200	glyphosate	14.000	116.200	0.000
FOREST CONIFER THINNING	0.410	glyphosate	0.000	0.000	0.200
		picloram	0.000	0.000	0.200
		triclopyr	0.000	0.000	0.010
FOREST INSECT CONTROL	755.780	MSMA	0.000	0.000	755.780
FOREST SITE PREPARATION	32.000	glyphosate	32.000	0.000	0.000
FOREST WEED SEED TREE	21.700	glyphosate	0.000	0.000	21.700
REGION TOTALS:	1,224.990		226.500	220.600	777.890

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: KAMLOOPS

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	252.050	glyphosate	0.000	149.850	102.200
FOREST CONIFER RELEASE	452.160	glyphosate	101.210	12.000	338.950
FOREST INSECT CONTROL		<i>B.t.k.</i>	3,180.000	0.000	0.000
		carbaryl	0.000	0.120	0.000
		MSMA	0.000	0.000	27.940
		NPV	200.000	0.000	0.000
		verbenone	0.000	86.000	0.000
	3,494.060				
FOREST RANGE MANAGEMENT		glyphosate	0.000	162.000	0.000
		MSMA	0.000	0.000	37.160
		picloram	0.000	347.310	0.000
	546.470				
FOREST SITE PREPARATION	84.700	glyphosate	84.700	0.000	0.000
FOREST WEED SEED TREE	203.400	glyphosate	0.000	0.000	203.400
REGION TOTALS:	5,032.840		3,565.910	757.280	709.650

REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY

REGION: NELSON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	66.800	glyphosate	66.800	0.000	0.000
FOREST CONIFER RELEASE	2.700	glyphosate	2.700	0.000	0.000
FOREST SITE PREPARATION	158.200	glyphosate	158.200	0.000	0.000
REGION TOTALS:	227.700		227.700	0.000	0.000

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: NELSON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	539.890	glyphosate	501.290	38.600	0.000
FOREST INSECT CONTROL	212.300	MSMA	0.000	0.000	212.300
FOREST RANGE MANAGEMENT	98.155	glyphosate	0.000	7.820	0.000
		picloram	0.000	90.335	0.000
FOREST SITE PREPARATION	38.500	glyphosate	38.500	0.000	0.000
REGION TOTALS:	888.845		539.790	136.755	212.300

**REGIONAL SUMMARY OF PESTICIDE USE, 1991
FOREST INDUSTRY**

REGION: CARIBOO

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	1,067.300	glyphosate	1,067.300	0.000	0.000
FOREST CONIFER RELEASE	467.400	glyphosate hexazinone	453.00 0.000	7.000 7.400	0.000 0.000
FOREST INSECT CONTROL	4.550	MSMA	0.000	0.000	4.550
FOREST SITE REHABILITATION	270.700	glyphosate	270.700	0.000	0.000
REGION TOTALS:	1,809.950		1,791.000	14.400	4.550

REGIONAL SUMMARY OF PESTICIDE USE, 1991
BCFS

REGION: CARIBOO

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	213.600	glyphosate	209.100	4.500	0.000
FOREST RANGE MANAGEMENT	2.720	glyphosate	0.000	2.720	0.000
FOREST SITE PREPARATION	149.500	glyphosate	149.500	0.000	0.000
REGION TOTALS:	365.820		358.600	7.220	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: CHILLIWACK

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	221.830	glyphosate	190.700	31.130	0.000
FOREST PRE-HARVEST TREATMENT	7.500	glyphosate	0.000	7.500	0.000
FOREST SITE PREPARATION	59.900	glyphosate	59.900	0.000	0.000
DISTRICT TOTALS:	289.230		250.600	38.630	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: VANCOUVER

DISTRICT: CHILLIWACK

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	592.200	glyphosate	543.100	49.100	0.000
FOREST CONIFER RELEASE	41.000	glyphosate	0.000	0.000	41.000
FOREST SITE PREPARATION	388.600	glyphosate	388.600	0.000	0.000
FOREST SITE REHABILITATION	139.600	glyphosate	139.600	0.000	0.000
DISTRICT TOTALS:	1,161.400		1,071.300	49.100	41.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: SQUAMISH

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	61.750	glyphosate	61.750	0.000	0.000
FOREST CONIFER RELEASE	57.100	glyphosate	57.100	0.000	0.000
DISTRICT TOTALS:	118.850		118.850	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: VANCOUVER

DISTRICT: SQUAMISH

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	90.740	glyphosate	84.500	6.240	0.000
FOREST CONIFER RELEASE	2.200	glyphosate	0.000	2.200	0.000
FOREST SITE REHABILITATION	45.000	glyphosate	0.000	45.000	0.000
DISTRICT TOTALS:	137.940		84.500	53.440	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: SUNSHINE COAST

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	394.300	glyphosate	335.700	12.100	46.500
FOREST CONIFER RELEASE	255.400	glyphosate	101.600	153.800	0.000
DISTRICT TOTALS:	649.700		437.300	165.900	46.500

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: DUNCAN

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	5.000	glyphosate	0.000	5.000	0.000
FOREST CONIFER RELEASE	72.810	glyphosate	0.000	41.500	31.310
FOREST SITE PREPARATION	171.400	glyphosate	0.000	85.700	0.000
		triclopyr	0.000	85.700	0.000
DISTRICT TOTALS:	249.210		0.000	217.900	31.310

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: VANCOUVER

DISTRICT: DUNCAN

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	0.220	glyphosate	0.000	0.220	0.000
DISTRICT TOTALS:	0.220		0.000	0.220	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: PORT ALBERNI

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	1,017.890	2,4-D amine glyphosate	0.000 237.700	0.000 125.800	30.010 624.380
FOREST RIGHT-OF-WAY MAINTENANCE	191.000	glyphosate	0.000	191.000	0.000
DISTRICT TOTALS:	1,208.890		237.700	316.800	654.390

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: CAMPBELL RIVER

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	1,073.500	2,4-D amine glyphosate	0.000 322.500	74.000 186.300	0.000 490.700
FOREST CONIFER RELEASE	186.200	2,4-D amine glyphosate triclopyr	0.000 64.300 0.000	0.000 8.500 39.400	70.000 4.000 0.000
FOREST RIGHT-OF-WAY MAINTENANCE	350.500	2,4-D amine glyphosate	0.000 0.000	15.000 335.500	0.000 0.000
FOREST SITE PREPARATION	15.100	glyphosate	15.100	0.000	0.000
DISTRICT TOTALS:	1,625.300		401.900	658.700	564.700

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: VANCOUVER

DISTRICT: CAMPBELL RIVER

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	206.900	glyphosate	97.500	109.400	0.000
FOREST CONIFER RELEASE	615.200	glyphosate	0.000	615.200	0.000
DISTRICT TOTALS:	822.100		97.500	724.600	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: PORT MCNEILL

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	1,645.600	glyphosate	246.500	116.700	1,282.400
FOREST CONIFER RELEASE	44.100	glyphosate	0.000	44.100	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	113.300	glyphosate	0.000	113.300	0.000
DISTRICT TOTALS:	1,803.000		246.500	274.100	1,282.400

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: VANCOUVER

DISTRICT: PORT NCNEILL

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	288.360	glyphosate	0.000	0.000	288.360
DISTRICT TOTALS:	288.360		0.000	0.000	288.360

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: VANCOUVER

DISTRICT: MID-COAST

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	27.500	glyphosate	0.000	27.000	0.000
		Na Meta	0.000	0.500	0.000
DISTRICT TOTALS:	27.500		0.000	27.500	0.000

SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS

REGION: VANCOUVER

DISTRICT: MID-COAST

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	21.000	glyphosate	0.000	21.000	0.000
FOREST CONIFER RELEASE	9.000	glyphosate	0.000	9.000	0.000
DISTRICT TOTALS:	30.000		0.000	30.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	56.300	glyphosate	0.000	0.000	56.300
DISTRICT TOTALS:	56.300		0.000	0.000	56.300

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE RUPERT

DISTRICT: LAKES

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	241.500	glyphosate	241.500	0.000	0.000
FOREST INSECT CONTROL	0.500	carbaryl	0.000	0.500	0.000
DISTRICT TOTALS:	242.000		241.500	0.500	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: PRINCE RUPERT

DISTRICT: MORICE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	182.570	glyphosate	140.900	41.670	0.000
FOREST CONIFER RELEASE	539.800	glyphosate	539.800	0.000	0.000
DISTRICT TOTALS:	722.370		680.700	41.670	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE RUPERT

DISTRICT: MORICE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	83.700	glyphosate	8.700	75.000	0.000
FOREST INSECT CONTROL	7.710	MSMA	0.000	0.000	7.710
DISTRICT TOTALS:	91.410		8.700	75.000	7.710

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: PRINCE RUPERT

DISTRICT: BULKLEY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	326.600	glyphosate	326.100	0.500	0.000
FOREST CONIFER RELEASE	107.300	glyphosate	107.300	0.000	0.000
DISTRICT TOTALS:	433.900		433.400	0.500	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE RUPERT

DISTRICT: BULKLEY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	250.000	glyphosate	250.000	0.000	0.000
FOREST INSECT CONTROL	0.500	MSMA	0.000	0.000	0.500
DISTRICT TOTALS:	250.500		250.000	0.000	0.500

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: PRINCE RUPERT

DISTRICT: KALUM

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	76.700	glyphosate	0.000	76.700	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	194.800	glyphosate	0.000	194.800	0.000
DISTRICT TOTALS:	271.500		0.000	271.500	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE RUPERT

DISTRICT: KALUM

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	40.800	glyphosate	0.000	40.800	0.000
FOREST SITE REHABILITATION	40.500	glyphosate	0.000	40.500	0.000
DISTRICT TOTALS:	81.300		0.000	81.300	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	25.800	glyphosate	6.000	19.800	0.000
FOREST SITE PREPARATION	77.200	glyphosate	77.200	0.000	0.000
DISTRICT TOTALS:	103.000		83.200	19.800	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE RUPERT

DISTRICT: NORTH COAST

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	180.600	glyphosate	180.600	0.000	0.000
FOREST SITE PREPARATION	103.000	glyphosate	0.000	103.000	0.000
DISTRICT TOTALS:	283.600		180.600	103.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	2,794.200	glyphosate	2,794.200	0.000	0.000
FOREST CONIFER RELEASE	1,899.640	glyphosate	1,899.640	0.000	0.000
FOREST SITE PREPARATION	980.720	glyphosate	980.720	0.000	0.000
DISTRICT TOTALS:	5,674.560		5,674.560	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: PRINCE GEORGE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	742.750	glyphosate	740.500	2.250	0.000
FOREST CONIFER RELEASE	339.700	glyphosate	257.000	82.700	0.000
FOREST INSECT CONTROL	3.050	MSMA	0.000	0.000	3.050
FOREST RANGE MANAGEMENT	1.648	picloram	0.000	1.648	0.000
FOREST SITE PREPARATION	39.000	glyphosate	39.000	0.000	0.000
DISTRICT TOTALS:	1,126.148		1036.500	85.598	3.050

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	374.820	glyphosate	374.820	0.000	0.000
DISTRICT TOTALS:	374.820		374.820	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: ROBSON VALLEY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INSECT CONTROL	0.150	MSMA	0.000	0.000	0.150
FOREST RANGE MANAGEMENT	24.310	glyphosate picloram	0.000 0.000	16.340 7.970	0.000 0.000
DISTRICT TOTALS:	24.460		0.000	24.310	0.150

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: PRINCE GEORGE

DISTRICT: VANDERHOOF

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST PRE-HARVEST TREATMENT	75.800	glyphosate	0.000	0.000	75.800
DISTRICT TOTALS:	75.800		0.000	0.000	75.800

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: VANDERHOOF

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	368.250	glyphosate	366.000	2.250	0.000
FOREST CONIFER RELEASE	73.000	glyphosate	73.000	0.000	0.000
FOREST INSECT CONTROL	75.000	MSMA	0.000	0.000	75.000
FOREST RANGE MANAGEMENT	2.000	picloram	0.000	2.000	0.000
DISTRICT TOTALS:	518.250		439.000	4.250	75.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	1,067.500	glyphosate	1,067.500	0.000	0.000
FOREST INSECT CONTROL	3.330	MSMA	0.000	0.000	3.330
FOREST SITE PREPARATION	155.400	glyphosate	155.400	0.000	0.000
DISTRICT TOTALS:	1,226.230		1,222.900	0.000	3.330

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: FORT ST. JAMES

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	546.550	glyphosate	544.300	2.250	0.000
FOREST INSECT CONTROL	145.000	MSMA	0.000	0.000	145.000
DISTRICT TOTALS:	691.550		544.300	2.250	145.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: PRINCE GEORGE

DISTRICT: MACKENZIE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	1,065.040	glyphosate	1,065.040	0.000	0.000
DISTRICT TOTALS:	1,065.040		1,065.040	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: MACKENZIE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	323.850	glyphosate	219.600	104.250	0.000
FOREST CONIFER RELEASE	258.400	glyphosate	88.200	170.200	0.000
FOREST INSECT CONTROL	0.300	MSMA	0.000	0.000	0.300
FOREST SITE PREPARATION	12.000	glyphosate	0.000	12.000	0.000
DISTRICT TOTALS:	594.550		307.800	286.450	0.300

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	1,195.800	glyphosate	1,075.800	120.000	0.000
FOREST RIGHT-OF-WAY MAINTENANCE	69.450	picloram	0.000	69.450	0.000
FOREST SITE PREPARATION	297.000	glyphosate	297.000	0.000	0.000
DISTRICT TOTALS:	1,562.250		1,372.800	189.450	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: DAWSON CREEK

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	626.600	glyphosate	626.600	0.000	0.000
FOREST RANGE MANAGEMENT	30.320	picloram	0.000	20.320	10.000
FOREST RIGHT-OF-WAY MAINTENANCE	2.500	2,4-D	0.000	1.250	0.000
		dicamba	0.000	1.250	0.000
FOREST SITE PREPARATION	358.100	glyphosate	358.100	0.000	0.000
DISTRICT TOTALS:	1,017.520		984.700	22.820	10.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
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
FOREST BRUSHING AND WEEDING	1,832.700	glyphosate	1,832.700	0.000	0.000
DISTRICT TOTALS:	1,832.700		1,832.700	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: FORT ST. JOHN

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	415.000	glyphosate	415.000	0.000	0.000
FOREST CONIFER RELEASE	102.600	glyphosate	102.600	0.000	0.000
FOREST RANGE MANAGEMENT	2.440	picloram	0.000	2.440	0.000
FOREST SITE PREPARATION	826.400	glyphosate	826.400	0.000	0.000
DISTRICT TOTALS:	1,346.440		1,344.000	2.440	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: PRINCE GEORGE

DISTRICT: FORT NELSON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	2,013.420	glyphosate	2,013.020	0.400	0.000
FOREST CONIFER RELEASE	171.000	glyphosate	171.000	0.000	0.000
FOREST INSECT CONTROL	553.000	<i>B.t.k.</i>	553.000	0.000	0.000
FOREST SITE PREPARATION	492.280	glyphosate	492.280	0.000	0.000
DISTRICT TOTALS:	3,229.700		3,229.300	0.400	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: CLEARWATER

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	11.600	glyphosate	0.000	11.600	0.000
FOREST CONIFER RELEASE	105.410	glyphosate	93.410	12.000	0.000
DISTRICT TOTALS:	117.010		93.410	23.600	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: KAMLOOPS

DISTRICT: KAMLOOPS

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INSECT CONTROL	40.000	MSMA	0.000	0.000	40.000
DISTRICT TOTALS:	40.000		0.000	0.000	40.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: KAMLOOPS

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INSECT CONTROL	201.840	MSMA	0.000	0.000	1.840
		NPV	200.000	0.000	0.000
		verbenone	0.000	0.000	0.000
FOREST RANGE MANAGEMENT	217.510	glyphosate	0.000	162.000	0.000
		picloram	0.000	55.510	0.000
FOREST WEED SEED TREE	203.400	glyphosate	0.000	0.000	203.400
DISTRICT TOTALS:	622.750		200.000	217.510	205.240

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: KAMLOOPS

DISTRICT: SALMON ARM

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	51.000	glyphosate	51.000	0.000	0.000
FOREST CONIFER RELEASE	17.000	glyphosate	0.000	17.000	0.000
FOREST INSECT CONTROL	1.780	MSMA	0.000	0.000	1.780
FOREST SITE PREPARATION	32.000	glyphosate	32.000	0.000	0.000
DISTRICT TOTALS:	101.780		83.000	17.000	1.780

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: SALMON ARM

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	102.250	glyphosate	0.000	0.050	102.200
FOREST RANGE MANAGEMENT	10.560	picloram	0.000	10.560	0.000
FOREST SITE PREPARATION	84.700	glyphosate	84.700	0.000	0.000
DISTRICT TOTALS:	197.510		84.700	10.610	102.200

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: KAMLOOPS

DISTRICT: VERNON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	220.900	glyphosate	129.500	91.400	0.000
FOREST CONIFER RELEASE	113.200	glyphosate	14.000	99.200	0.000
FOREST WEED SEED TREE	21.700	glyphosate	0.000	0.000	21.700
DISTRICT TOTALS:	355.800		143.500	190.600	21.700

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: VERNON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	138.200	glyphosate	0.000	138.200	0.000
FOREST INSECT CONTROL		<i>B.t.k.</i>	3,180.000	0.000	0.000
		carbaryl	0.000	0.120	0.000
	3,190.920	MSMA	0.000	0.000	10.800
FOREST RANGE MANAGEMENT	17.960	picloram	0.000	17.960	0.000
DISTRICT TOTALS:	3,347.080		3,180.000	156.280	10.800

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: KAMLOOPS

DISTRICT: PENTICTON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	13.000	glyphosate	0.000	13.000	0.000
FOREST CONIFER THINNING	0.410	glyphosate	0.000	0.000	0.200
		picloram	0.000	0.000	0.200
		triclopyr	0.000	0.000	0.010
FOREST INSECT CONTROL	714.000	MSMA	0.000	0.000	714.000
DISTRICT TOTALS:	727.410		0.000	13.000	714.410

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: PENTICTON

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	338.950	glyphosate	0.000	0.000	338.950
FOREST INSECT CONTROL	101.300	MSMA verbenone	0.000 0.000	0.000 86.000	15.300 0.000
FOREST RANGE MANAGEMENT	89.700	picloram	0.000	89.700	0.000
DISTRICT TOTALS:	529.950		0.000	175.700	354.250

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: MERRITT

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST RANGE MANAGEMENT		MSMA	0.000	0.000	37.160
		picloram	0.000	154.000	0.000
	191.160				
DISTRICT TOTALS:	191.160		0.000	154.000	37.160

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: KAMLOOPS

DISTRICT: LILLOOET

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	7.800	glyphosate	7.800	0.000	0.000
FOREST RANGE MANAGEMENT	19.580	picloram	0.000	19.580	0.000
DISTRICT TOTALS:	27.380		7.800	19.580	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: NELSON

DISTRICT: CRANBROOK

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST RANGE MANAGEMENT	20.000	glyphosate	0.000	2.500	0.000
		picloram	0.000	17.500	0.000
DISTRICT TOTALS:	20.000		0.000	20.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: NELSON

DISTRICT: INVERMERE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INSECT CONTROL	3.200	MSMA	0.000	0.000	3.200
FOREST RANGE MANAGEMENT	1.676	picloram	0.000	1.676	0.000
DISTRICT TOTALS:	4.876		0.000	1.676	3.200

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: NELSON

DISTRICT: GOLDEN

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST CONIFER RELEASE	2.700	glyphosate	2.700	0.000	0.000
FOREST SITE PREPARATION	158.200	glyphosate	158.200	0.000	0.000
DISTRICT TOTALS:	160.900		160.900	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: NELSON

DISTRICT: REVELSTOKE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	66.800	glyphosate	66.800	0.000	0.000
DISTRICT TOTALS:	66.800		66.800	0.000	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: NELSON

DISTRICT: REVELSTOKE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	539.890	glyphosate	501.290	38.600	0.000
FOREST SITE PREPARATION	38.500	glyphosate	38.500	0.000	0.000
DISTRICT TOTALS:	578.390		539.790	38.600	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: NELSON

DISTRICT: BOUNDARY

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST INSECT CONTROL	209.100	MSMA	0.000	0.000	209.100
FOREST RANGE MANAGEMENT	76.479	glyphosate picloram	0.000 0.000	5.320 71.159	0.000 0.000
DISTRICT TOTALS:	285.579		0.000	76.479	209.100

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
FOREST INDUSTRY**

REGION: CARIBOO

DISTRICT: QUESNEL

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	1,067.300	glyphosate	1,067.300	0.000	0.000
FOREST CONIFER RELEASE	467.400	glyphosate	453.000	7.000	0.000
		hexazinone	0.000	7.400	0.000
FOREST INSECT CONTROL	4.550	MSMA	0.000	0.000	4.550
FOREST SITE REHABILITATION	270.700	glyphosate	270.700	0.000	0.000
DISTRICT TOTALS:	1,809.950		1,791.000	14.400	4.550

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: CARIBOO

DISTRICT: QUESNEL

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	211.350	glyphosate	209.100	2.250	0.000
FOREST RANGE MANAGEMENT	2.720	glyphosate	0.000	2.720	0.000
FOREST SITE PREPARATION	149.500	glyphosate	149.500	0.000	0.000
DISTRICT TOTALS:	363.570		358.600	4.970	0.000

**SUMMARIES OF PESTICIDE USE
BY FOREST REGION AND DISTRICT, 1991
BCFS**

REGION: CARIBOO

DISTRICT: WILLIAMS LAKE

PURPOSE	TOTAL (ha) TREATED	PESTICIDES	AREA (ha) BREAKDOWN BY TREATMENT METHODS		
			AERIAL SPRAY	GROUND APPLIC.	STEM INJECTION
FOREST BRUSHING AND WEEDING	2.250	glyphosate	0.000	2.250	0.000
DISTRICT TOTALS:	2.250		0.000	2.250	0.000

TABLE VII

PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL PURPOSE, 1991

PURPOSE	PESTICIDE	BC FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
FOREST BRUSHING AND WEEDING	2,4-D amine	0.000	104.010
	glyphosate	7,700.210	14,957.010
	Na Meta	0.000	0.500
Total ha		22,761.730	
FOREST CONIFER RELEASE	2,4-D amine	90.800	70.000
	glyphosate	2,648.750	5,435.360
	hexazinone	0.000	7.400
	triclopyr	0.000	39.400
Total ha		8,291.710	
FOREST CONIFER THINNING	glyphosate	0.000	0.200
	picloram	0.000	0.200
	triclopyr	0.000	0.010
	verbenone	0.000	2.500
Total ha		2.910	
FOREST FUNGUS CONTROL	1,3-dichloro	0.000	0.478
	glyphosate	0.000	0.250
Total ha		0.728	
FOREST INSECT CONTROL	<i>B.t.k.</i>	3,733.000	0.000
	carbaryl	3.260	0.000
	dimethoate	0.150	0.000
	mineral oil	0.050	0.000
	MSMA	481.950	763.660
	NPV	200.000	0.000
	oxydemeton	0.150	0.000
	verbenone	86.680	0.000
Total ha		5,268.900	
FOREST PRE-HARVEST TREATMENT	glyphosate	0.000	83.300
Total ha		83.300	

TABLE VII (CON'T)

PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL PURPOSE, 1991

PURPOSE	PESTICIDE	BC FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
FOREST RANGE MANAGEMENT	glyphosate	191.003	0.000
	MSMA	37.160	0.000
	picloram	482.023	0.000
Total ha		710.186	
FOREST RIGHT-OF-WAY MAINTENANCE	2,4-D	1.250	0.000
	2,4-D amine	0.000	15.000
	dicamba	1.250	0.000
	glyphosate	0.000	834.600
	picloram	0.000	69.450
Total ha		921.550	
FOREST SEED AND CONE	permethrin	0.022	0.000
Total ha		0.022	
FOREST SITE PREPARATION	glyphosate	2,585.080	1,941.520
	triclopyr	0.000	85.700
Total ha		4,612.300	
FOREST SITE REHABILITATION	glyphosate	225.100	270.700
Total ha		495.800	
FOREST WEED SEED TREE	glyphosate	203.400	21.700
Total ha		225.100	

Provincial Summary of Area (ha) Treated¹ with Pesticides by Control Purpose, 1991

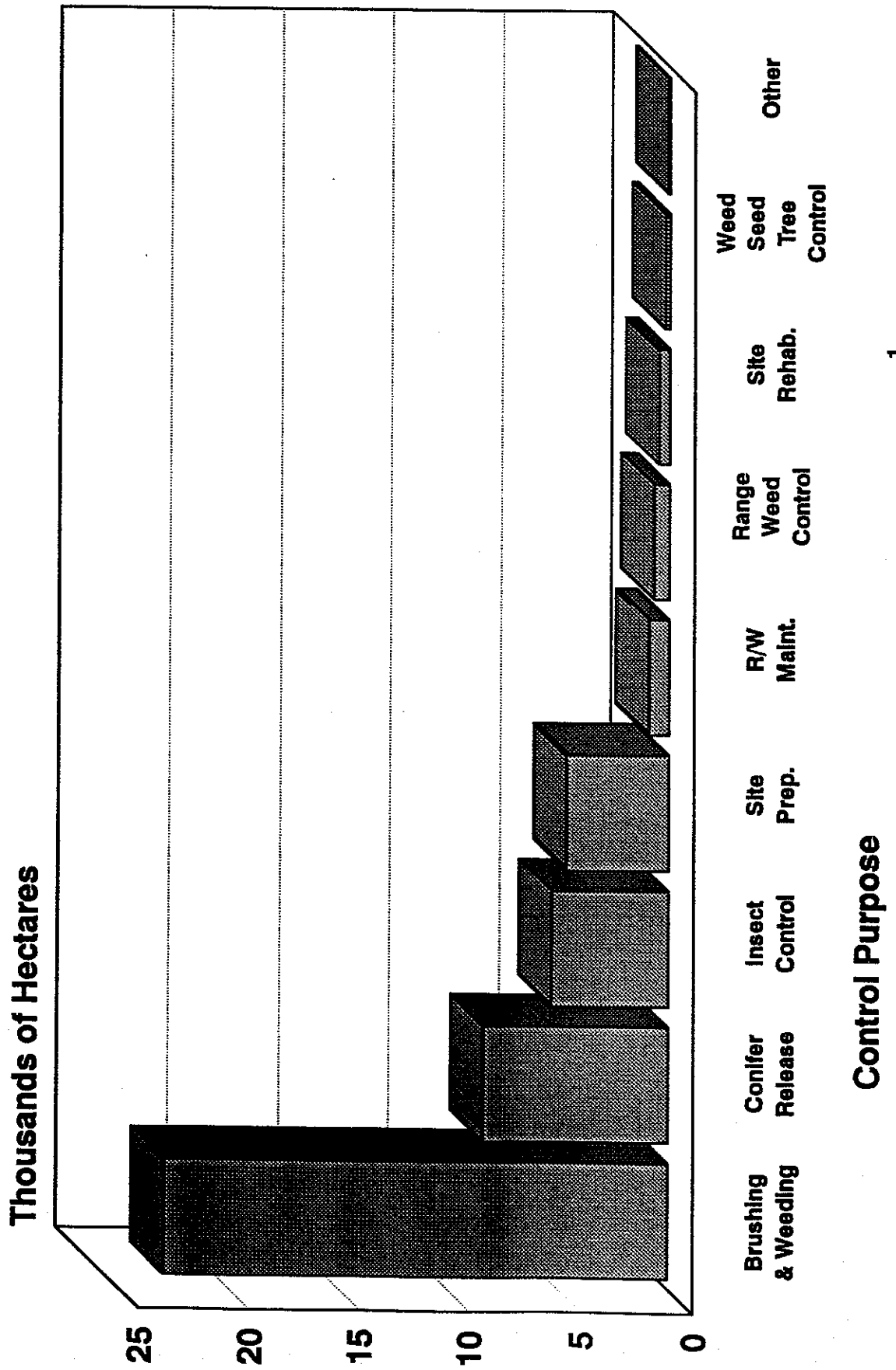


TABLE VIII

PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL METHOD, 1991

METHOD	PESTICIDES	BC FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
TRUCK MOUNTED SPRAY BOOM	2,4-D	1.250	0.000
	dicamba	1.250	0.000
	glyphosate	232.503	469.370
	picloram	428.879	0.000
	triclopyr	0.000	85.700
Total ha	1,218.952		
BACK PACK SPRAYER	carbaryl	3.260	0.000
	glyphosate	722.440	580.900
	picloram	17.638	0.000
	triclopyr	0.000	39.400
Total ha	1,363.638		
MIST BLOWER	glyphosate	84.400	296.800
Total ha	381.200		
POWER HOSE/NOZZLE	2,4-D amine	0.000	89.000
	glyphosate	314.400	880.930
	hexazinone	0.000	7.400
	permethrin	0.022	0.000
	picloram	23.996	69.450
Total ha	1,385.198		
HAND BROADCAST	glyphosate	0.000	17.800
	Na Meta	0.000	0.500
	picloram	1.510	0.000
Total ha	19.810		
STEM INJECTION	2,4-D amine	0.000	0.400
	dimethoate	0.150	0.000
	glyphosate	532.760	2,066.410
	mineral oil	0.050	0.000
	MSMA	478.750	763.660
	oxydemeton	0.150	0.000
	picloram	0.000	0.200
	triclopyr	0.000	0.010
Total ha	3,842.540		

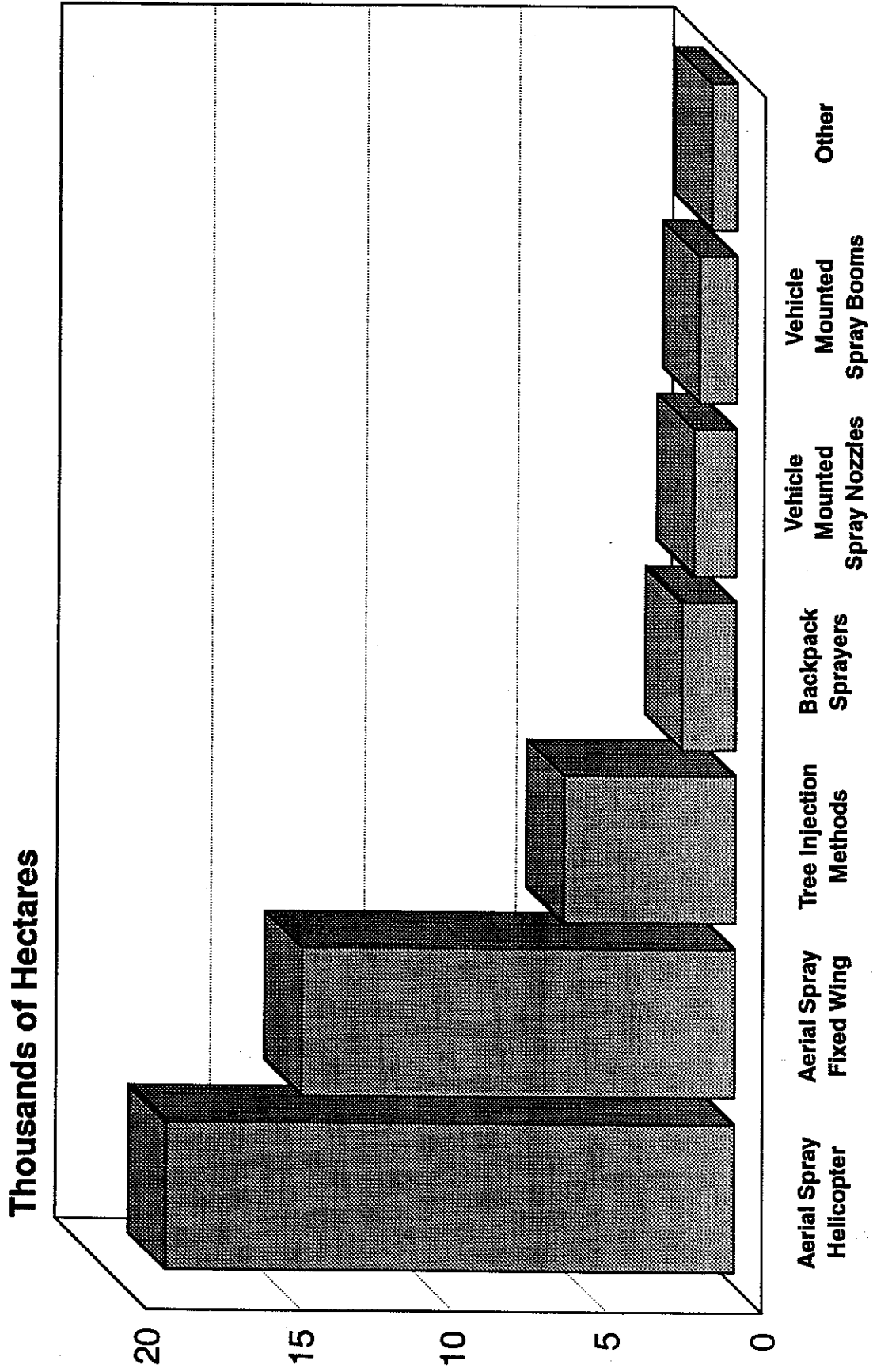
TABLE VIII (CON'T)

PROVINCIAL SUMMARY OF AREA (ha)
TREATED BY CONTROL METHOD, 1991

METHOD	PESTICIDES	BC FOREST SERVICE ha Treated	FOREST INDUSTRY ha Treated
STUMP APPLICATION	1,3-dichloro	0.000	0.478
	2,4-D amine	90.800	99.610
	glyphosate	474.750	998.830
	picloram	10.000	0.000
	Total ha	1,674.468	
GRANULAR SPREADER	verbenone	0.680	0.000
Total ha		0.680	
FIXED WING	<i>B.t.k.</i>	3,733.000	0.000
	glyphosate	2,492.540	7,900.940
Total ha		14,126.480	
HELICOPTER	glyphosate	8,084.550	10,224.260
	NPV	200.000	0.000
	verbenone	0.000	0.000
Total ha		18,508.810	
COMBINED GROUND METHODS	glyphosate	615.200	108.400
Total ha		723.600	
BRUSH SAW APPLICATOR	MSMA	40.360	0.000
Total ha		40.360	
BACK PACK SPRAYER MOTOR	verbenone	0.000	2.500
Total ha		2.500	
OTHER	verbenone	86.000	0.000
Total ha		86.000	
GRAND TOTALS		18,671.28	24,702.948

Provincial Summary of Area (ha) Treated

with Pesticides by Method of Application, 1991¹

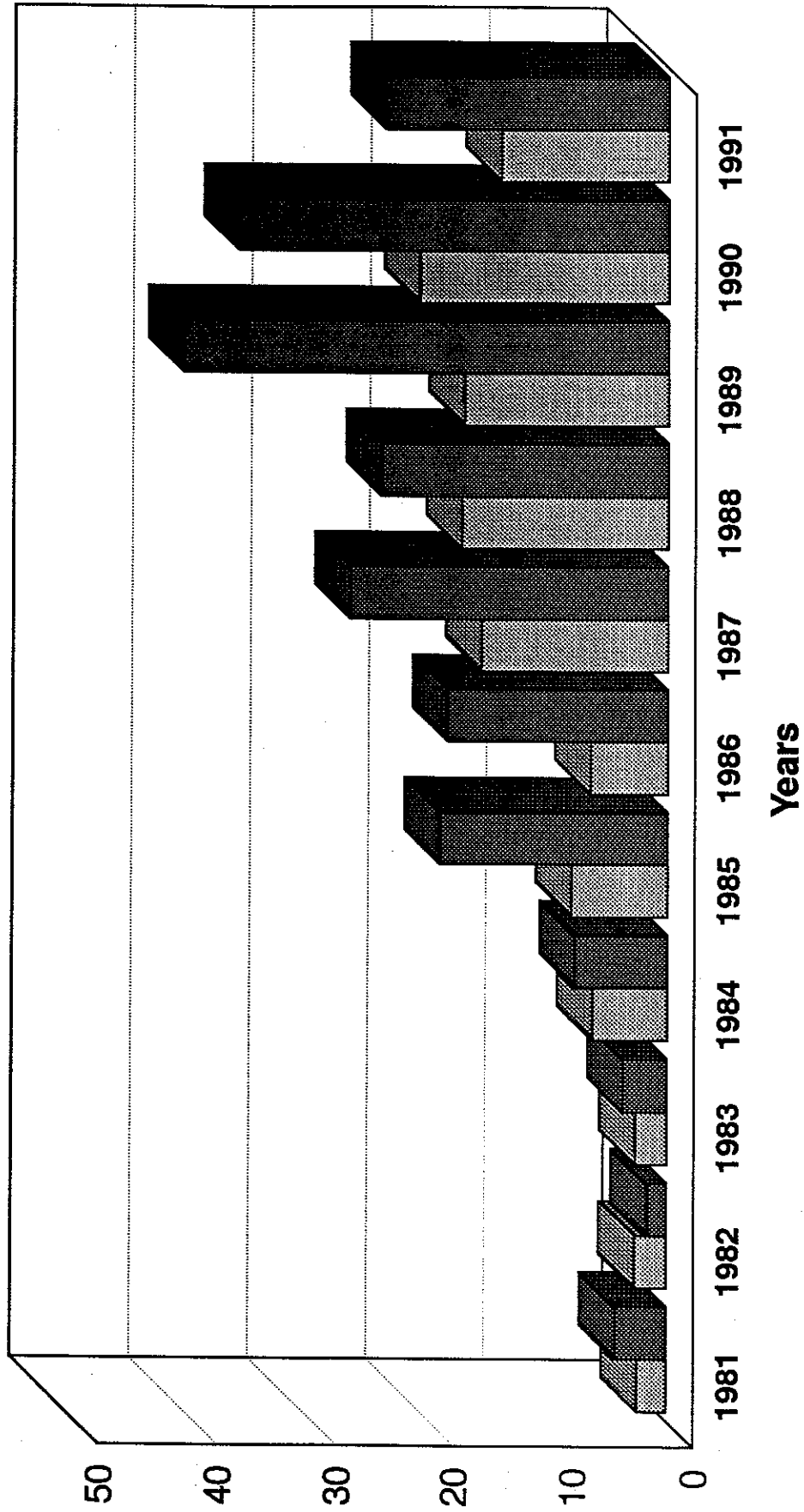


¹ B.C. Forest Service & Industry Combined

Area Treated with Herbicides

for Forestry Purposes, 1981-1991

Thousands of Hectares

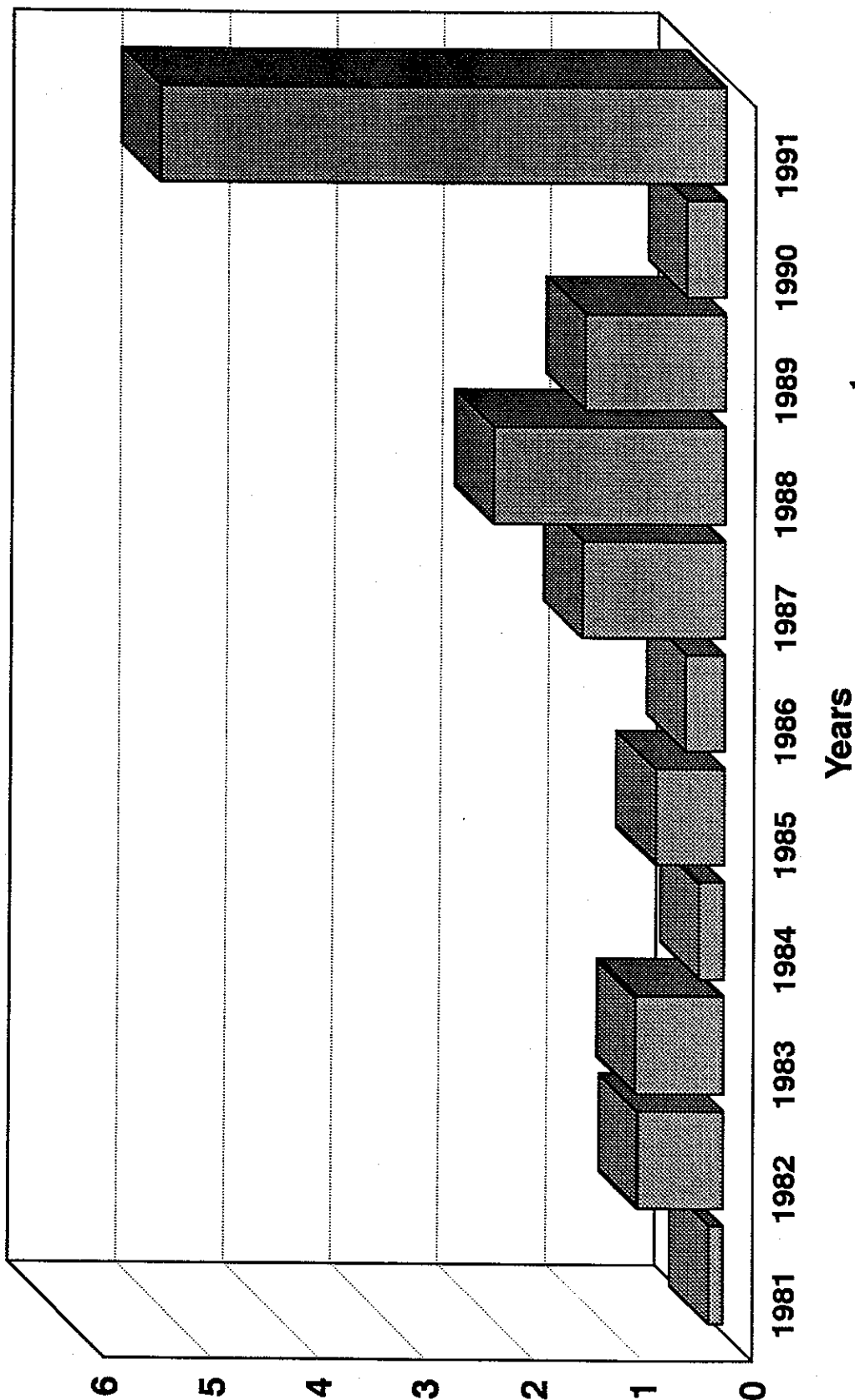


■ B.C.F.S. ■ Forest Industry

Area Treated with Insecticides

for Forestry Purposes, 1981-1991¹

Thousands of Hectares Treated



¹ B.C. Forest Service & Industry Combined

DISCUSSIONS AND CONCLUSIONS

Pesticides were applied to 43 374 ha of British Columbia forest and rangeland in 1991, down by approximately 14 288 ha from the previous year. Forest companies were responsible for 57% of the total area treated and the Forest Service for 43%, as compared to 64% and 36%, respectively, in 1990.

Glyphosate was applied to over 85% of the provincial area treated with pesticides in 1991. The use of 2,4-D has declined from 1 052 ha treated in 1990 to 281 ha in 1990, while MSMA use has increased to 1 283 ha in 1991, as compared to 431 ha in 1990. As a result of recent population increases of defoliating insects in the interior of British Columbia, a biological insecticide, *B.t.k.*, was applied to almost 4 000. Due to natural insect population fluctuations this level of use will not likely continue for more than a few successive years.

Herbicide applications for the purpose of controlling unwanted vegetation remained the major forestry related use of pesticides.

Helicopters and fixed-wing aircraft were used to apply pesticides to approximately 75% of the total provincial area treated in 1991, as compared to 68% in 1990.

ACKNOWLEDGEMENTS

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