

PESTICIDE USE  
IN BRITISH COLUMBIA FORESTRY  
1984

by  
P. Humphreys  
Protection Branch

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FOREWORD

"Pesticide Use in British Columbia Forestry, 1984" is the fourth internal report on annual pesticide use resulting from a cooperative survey project established in 1981 by the B.C. Council of Forest Industries, the B.C. Ministry of Forests and the B.C. Ministry of Environment. Information used to generate this report is now an annual requirement by the Ministry of Environment (Pesticide Control Branch) of all pesticide use permit holders. Data included represents all B.C. forest companies and B.C. Forest Service pesticide use permits which were active in 1984. Summarized in tables and illustrated graphically, information presented includes amounts of each pesticide used and respective areas treated; areas treated by control purpose and method of application; areas treated by forest type, areas actually treated compared to areas scheduled for treatment by pesticide; reasons for pesticide use permit non-utilization, as well as herbicide use trends from 1975 - 1984.

## INTRODUCTION

"Pesticide use in British Columbia Forestry, 1984" represents the fourth and possibly final report of its kind utilizing the B.C. Forest Service internal report format. Future reports on pesticide use in B.C. forestry are expected to take a public information leaflet format.

It succeeds internal reports PM-PB-8, PM-PB-11 and PM-PB-13 on pesticide use in British Columbia Forestry for the years 1981, 1982 and 1983, respectively.

All four reports were generated through a cooperative project by the B.C. Council of Forest Industries, the B.C. Ministry of Environment (Pesticide Control Branch) and the B.C. Ministry of Forests to establish annual records of actual pesticide applications to B.C. forest and rangeland.

Since 1983 the B.C. Ministry of Environment, Pesticide Control Branch, has required pesticide use permit holders to submit follow-up data on all actual permits each year. This report, similar to the 1982 and 1983 reports, was generated from such data, which is summarized and illustrated in tables, graphs, and includes the following information:

- (1) Numbers of 1984 pesticide use permits issued; implemented, cancelled and appealed.

- (2) Environmental Appeal Board decisions on all appealed permits.
- (3) Total hectares of forest land treated with pesticides.
- (4) Total kilograms of pesticide active ingredient applied to forest land.
- (5) Total hectares of forest land treated with pesticide by control purpose - e.g. conifer release, pre-commercial thinning, insect control;
- (6) Total hectares of forest land treated with pesticides by method of treatment - e.g. tree injection methods, aerial helicopter spray;
- (7) Total hectares of forest land treated with pesticides by forest stand type identity - e.g. mature, immature, not satisfactorily restocked;
- (8) Total hectares of forest land treated with pesticides by forest region - e.g. Prince George, Nelson, Kamloops.

The above mentioned data is further differentiated by:

- (i) User - B.C. Forest Service, B.C. forest industry or a combination of both.
- (ii) Pesticide used - e.g. 2,4-D amine, glyphosate;
- (iii) Type of pesticide - herbicide, fungicide, or insecticide;
- (iv) Project type - research or operational.

Other graphical comparisons include:

- (1) Areas scheduled for pesticide treatments compared to areas actually treated;
- (2) Reasons for pesticide use permit cancellations by area affected;
- (3) Total areas of forest land treated with herbicides by the B.C. Forest Service and B.C. forest industry, 1975-1984.

### FORESTRY PESTICIDE USE INFORMATION SYSTEMS

A computerized pesticide use information system was developed in 1984 by the Ministry of Environment, Pesticide Control Branch, to assist in their permit approval and tracking process.

Information, stored on the ENV1 VAX computer, consists of items marked on the Ministry of Environment, Pesticide use permit application and follow-up report (Figures 1 and 2). This computer is capable of being accessed by local and remote terminals.

The Pesticide Control Branch has proposed that direct users of their system be all those responsible for overseeing permit review and approval in Victoria. This will include the Ministry of Forests, Protection Branch, which will achieve direct on-line access to this system via their own terminal in 1985.

The main objectives of this pesticide information system will be to provide permit information to forestry pesticide users on a daily basis, and to generate summaries on overall pesticide use for Protection Branch reports and requests from individuals involved in forestry.

Figure 1. REVISED (1984) PESTICIDE USE PERMIT APPLICATION CODED  
FOR ENVI VAX COMPUTERIZED PESTICIDE INFORMATION SYSTEM

|                                                                                                                                                                                                                                                   |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------|---------|--------------------------------------------------------------------------------|------------|---------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------|---------------|-----------------------------|
|                                                                                                                                                                  |                                    | <b>Province of<br/>British Columbia</b> |         | <b>Ministry of<br/>Environment</b>                                             |            | <b>Pesticide Control Branch</b><br>810 Blanshard Street |                                               | <b>Victoria, British Columbia V8V 1X5</b><br>Telephone: (604) 387-4321 |               |                             |
| <h2 style="margin: 0;">PESTICIDE USE PERMIT APPLICATION</h2>                                                                                                                                                                                      |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| <p>Seven completed copies of this form and maps are required along with one copy of the map on the reverse side of this form. Shaded areas are for Pesticide Control Branch use only. For complete instructions refer to Guide to Applicants.</p> |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| 1 Name of Applicant                                                                                                                                                                                                                               |                                    |                                         |         | Applicants File No.                                                            |            |                                                         | Application No.                               |                                                                        |               |                             |
| Address                                                                                                                                                                                                                                           |                                    |                                         |         | Tel. No.                                                                       |            |                                                         | M. of E. Region                               |                                                                        | Ref. to BCPCB |                             |
| 2 Name of Contractor                                                                                                                                                                                                                              |                                    |                                         |         | Pest Control Service Lic. No.                                                  |            |                                                         | Contract Due                                  |                                                                        |               |                             |
| Address                                                                                                                                                                                                                                           |                                    |                                         |         | Tel. No.                                                                       |            |                                                         |                                               |                                                                        |               |                             |
| 3 Permit Category Applied for                                                                                                                                                                                                                     | Use                                | Special Use                             |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| 4 a. Pesticide Trade Name                                                                                                                                                                                                                         | b. Active Ingredient (common name) |                                         |         | a.1 Code                                                                       | c. PCP No. | d. Application Rate (kg a.i./ha)                        | e. Treatment Area (ha)                        | f. Quantity (kg a.i.)                                                  |               |                             |
|                                                                                                                                                                                                                                                   |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| Additional Information                                                                                                                                                                                                                            |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| 5 Target Species                                                                                                                                                                                                                                  |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| 6 Purpose                                                                                                                                                                                                                                         |                                    |                                         |         |                                                                                |            |                                                         |                                               | Purpose Code                                                           |               |                             |
| 7 a. Nearest Town                                                                                                                                                                                                                                 |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| b. Specific Location                                                                                                                                                                                                                              |                                    |                                         |         |                                                                                |            |                                                         |                                               | NTS Map Ref.                                                           |               |                             |
| 8 Application Method                                                                                                                                                                                                                              |                                    |                                         |         |                                                                                |            |                                                         |                                               | Method Code                                                            |               |                             |
| 9 Commencement Date                                                                                                                                                                                                                               | Yr                                 | Mo                                      | Day     | Completion Date                                                                | Yr         | Mo                                                      | Day                                           |                                                                        |               |                             |
| 10 Aquatic Information                                                                                                                                                                                                                            |                                    |                                         |         | a. 10 metre pesticide-free zone to be maintained on all water bodies and wells |            | Yes                                                     | No                                            |                                                                        |               |                             |
| b. Distance to nearest domestic water intake or well                                                                                                                                                                                              |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| c. Additional information                                                                                                                                                                                                                         |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| 11 Land Ownership                                                                                                                                                                                                                                 |                                    | Public                                  | Private |                                                                                |            |                                                         | 12 For Special Use Permit Applications        |                                                                        | Yes           | No                          |
|                                                                                                                                                                                                                                                   |                                    |                                         |         |                                                                                |            |                                                         | a. Research outline submitted                 |                                                                        |               |                             |
| 13 Name of Project Supervisor                                                                                                                                                                                                                     |                                    |                                         |         |                                                                                |            |                                                         | b. Research report to be submitted by         |                                                                        | Date          |                             |
| Tel. No.                                                                                                                                                                                                                                          |                                    |                                         |         |                                                                                |            |                                                         | c. Federal authorization for unregistered use |                                                                        | Attached      | To be provided prior to use |
| Pesticide Applicator Certificate No.                                                                                                                                                                                                              |                                    |                                         |         | Category of Certification                                                      |            |                                                         |                                               |                                                                        |               |                             |
| 14 Signature of Applicant                                                                                                                                                                                                                         |                                    |                                         |         | Title                                                                          |            |                                                         |                                               | Date of Application                                                    |               |                             |
|                                                                                                                                                                                                                                                   |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
|                                                                                                                                                                                                                                                   |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| <p><b>Authorization:</b> The above pesticide use is authorized subject to the <i>Pesticide Control Act</i> and the additional conditions listed on the covering page. Permit is not valid unless signed by Administrator.</p>                     |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |
| Administrator: Pesticide Control Act                                                                                                                                                                                                              |                                    |                                         |         | Date                                                                           |            |                                                         |                                               |                                                                        |               |                             |
| ENV 2112                                                                                                                                                                                                                                          |                                    |                                         |         |                                                                                |            |                                                         |                                               |                                                                        |               |                             |

Figure 2. 1985 FOLLOW-UP FORM ISSUED TO FOREST PESTICIDE USE PERMIT HOLDERS BY THE B.C. PESTICIDE CONTROL BRANCH

|                                                                                   |                                         |                                    |                                                                                                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Province of<br/>British Columbia</b> | <b>Ministry of<br/>Environment</b> | <b>Pesticide Control Branch<br/>810 Blanshard Street<br/>Victoria<br/>British Columbia<br/>V8V 1X5<br/>Telephone 387-4321</b> |
|-----------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|

Pesticide Use Follow-up Report

1985

To Permit Holder:

Re: Actual Pesticide Use Under Permit

Please complete and return this form prior to December 31, 1985.

\*\*\*\*\*

Pesticide Use in 1985 Under Permit No. \_\_\_\_\_

| Pesticide | Quantity of Active<br>Ingredient Used (kg) | Area Treated (ha) |
|-----------|--------------------------------------------|-------------------|
|           |                                            |                   |
|           |                                            |                   |
|           |                                            |                   |
|           |                                            | Total area: _____ |

STAND INFORMATION (if applicable, refer to back for explanation of terms)

Type Identity \_\_\_\_\_

Treated Stand Type Label:

|                             |       |
|-----------------------------|-------|
| 1. Species & %              | _____ |
| 2. Average Age              | _____ |
| 3. Average Height (m)       | _____ |
| 4. Average dbh & Range (cm) | _____ |
| 5. Site Class               | _____ |
| 6. Crown Closure (%)        | _____ |
| 7. Stems/ha                 | _____ |

Height of Target Species (m) \_\_\_\_\_

If no work was conducted under this permit in 1985 please give reason.  
\_\_\_\_\_

☐ If no future pesticide use will be conducted under this permit please check here.

|                    |                |               |
|--------------------|----------------|---------------|
| _____<br>Signature | _____<br>Title | _____<br>Date |
|--------------------|----------------|---------------|

RESULTS OF THE 1984 B.C. FORESTRY PESTICIDE USE SURVEY

Results of the 1984 pesticide use survey are summarized in tables and graphs on the following pages.

A total of 313 forestry pesticide use permits were issued in 1984, of which 181 or 58 percent were actually implemented. Most of the 313 permits were valid for three years. One hundred and four or 33 percent of the permits issued were cancelled, postponed or unreported<sup>1</sup> and 28 or 9 percent were cancelled by the Pesticide Control Branch at the request of the permit holders. (Table I).

The number of forestry pesticide use permits issued in 1984 roughly tripled from the previous year.

Fourteen permits were appealed in 1984 compared to 5 in 1983 and 39 in 1982. Two of the appealed permits were cancelled or revoked as a result of Environmental Appeal Board decisions, five were amended and five were supported. Two appeals were withdrawn. (Table II).

---

<sup>1</sup> Four permits were still unaccounted for (i.e., no follow-up information had been received) when this report was written.

A total of 9546.6 hectares of immature forest stands were treated with pesticides in 1984. Residual, not satisfactorily restocked and mature stands accounted for, respectively, 2000.2, 1097.9 and 346.8 hectares. Pesticide applications to rangeland, roadsides, forest nurseries and seed orchards involved 1137.1 hectares (Table VIII, Figure 8).

Forty-four percent or 14,132.1 hectares were actually treated with pesticides out of 31,877.6 hectares scheduled for treatment in 1984. Of the reasons given for the non-utilization of pesticide use permits, 1640.3 hectares were not treated because of funding or manpower problems, 1614.4 hectares were not treated because of postponement, 1536.9 hectares were not treated because of technical problems, 1335.5 hectares were not treated because of cancellations and 1155.0 hectares were not treated because the projects were completed in previous years or the project was abandoned (Figure 9).

Total area treated with herbicides more than doubled from 6181 hectares in 1983 to 14,132.1 hectares in 1984. This has been the greatest area treated with herbicides, for forest management purposes, in a single year, to date.

The herbicides 2,4-D amine/ester and glyphosate, which was registered for forestry in 1984, were the two major pesticides utilized by foresters. 2,4-D amine/ester was applied to 7467.0 hectares or 53 percent of B.C. forests treated with pesticides, and glyphosate to 6008.4 hectares or 43 percent (Table III, Figure 3).

In terms of weight of active ingredient applied, the three most commonly used pesticides were 2,4-D amine/ester (7260.1 kg. active ingredient), glyphosate (6492.5 kg. active ingredient) and MSMA (564.2 kg. active ingredient). (Table III, Figure 4).

Most 1984 pesticide use projects were located in the Vancouver, Prince George and Prince Rupert forest regions with respectively, 9975.1, 2533.6 and 868.2 hectares treated with pesticides (Table IV, Figure 5).

Stand tending operations involving vegetation management remained in 1984, as in previous years, the most common purpose of forestry pesticide use.

Herbicide applications for conifer release were made to 7475.1 hectares. This was an increase from 1983 of 2,857.4 hectares.

Other types of stand tending operations using herbicides also increased from 1983 by 4191.2 hectares. In 1984 brushing and weeding, site preparation, seed tree control and pre-commercial thinning involved a total of 5265.6 hectares. Right-of-way maintenance and rangeland noxious weed control together accounted for 1153.1 hectares, while insect, fungus and deer control accounted for 238.2 hectares treated with other types of pesticides (Tables V and VI, Figure 6).

Tree injection or cut surface treatments employing such equipment as brush saws, injectors and spot guns, were used on 9231.0 hectares. Backpack sprayers and vehicle mounted spray booms or nozzles were used to apply pesticides to respectively, 1172.8 hectares and 961.0 hectares. Aerial (helicopter) spray applications involved 2761.9 hectares of forest land. This area was approximately eleven times greater than that treated aurally in 1983 (Table VII, Figure 7).

TABLE I. THE FATE OF 1984 PESTICIDE USE PERMITS ISSUED  
BY THE B. C. PESTICIDE CONTROL BRANCH, MINISTRY OF ENVIRONMENT

|                                                         | B.C. FOREST<br>SERVICE |     | FOREST<br>INDUSTRY |     | TOTAL |     |
|---------------------------------------------------------|------------------------|-----|--------------------|-----|-------|-----|
|                                                         | #                      | %   | #                  | %   | #     | %   |
| PERMITS ISSUED<br>(TOTAL)                               | 167                    | 100 | 146                | 100 | 313   | 100 |
| PERMITS<br>IMPLEMENTED BY<br>HOLDER                     | 102                    | 61  | 79                 | 54  | 181   | 58  |
| PERMITS CANCELLED<br>OR POSTPONED<br>BY HOLDER          | 43                     | 26  | 61                 | 42  | 104   | 33  |
| PERMITS CANCELLED<br>BY THE PESTICIDE<br>CONTROL BRANCH | 22                     | 13  | 6                  | 4   | 28    | 9   |

TABLE II. THE FATE OF APPEALED 1984 PESTICIDE USE PERMITS  
AS DETERMINED BY THE B.C. ENVIRONMENTAL APPEAL BOARD

|                                       | B.C. FOREST<br>SERVICE<br># | FOREST<br>INDUSTRY<br># | TOTAL<br># |
|---------------------------------------|-----------------------------|-------------------------|------------|
| PERMITS APPEALED                      | 9                           | 5                       | 14         |
| APPEALED PERMITS<br>CANCELLED/REVOKED | 2                           | 0                       | 2          |
| APPEALED PERMITS<br>AMENDED           | 2                           | 3                       | 5          |
| APPEALED PERMITS<br>SUPPORTED         | 3                           | 2                       | 5          |
| APPEALS WITHDRAWN                     | 2                           | 0                       | 2          |

TABLE III. SUMMARY OF PESTICIDE USE<sup>1</sup>, 1984

| PESTICIDE  | B.C. FOREST SERVICE |                                |                   | FOREST INDUSTRY |                   |                   |
|------------|---------------------|--------------------------------|-------------------|-----------------|-------------------|-------------------|
|            | OP <sup>2</sup>     | ha treated<br>RES <sup>3</sup> | kg a.i.<br>OP RES | OP              | ha treated<br>RES | kg a.i.<br>OP RES |
| ASULAM     | 4.2                 | 0                              | 9.0               | 0               | 0.1               | 0 0.2             |
| BENOMYL    | 0                   | 0.5                            | 0                 | 0               | 0                 | 0 0               |
| CARBARYL   | 0                   | 0                              | 0                 | 30.0            | 0                 | 30.0 0            |
| CARBOFURAN | 0                   | 0.5                            | 0                 | 0               | 0                 | 0 0               |
| DPX-T6376  | 0                   | 0.04                           | 0                 | 0               | 0.04              | 0 0.01            |
| FERBAM     | 0                   | 0.5                            | 0                 | 0               | 0                 | 0 0               |
| FOSAMINE   | 20.1                | 0                              | 75.4              | 24.9            | 0                 | 21.0 0            |
| GLYPHOSATE | 3456.5              | 64.0                           | 4124.7            | 2477.5          | 10.4              | 2313.5 11.6       |
| HEXAZINONE | 0                   | 0.5                            | 0                 | 0               | 20.3              | 0.1 61.9          |
| MSMA       | 191.0               | 0                              | 1.5               | 148.1           | 0                 | 562.7 0           |

1. Data presented includes pesticides applied to rangeland administered by the B.C. Forest Service.
2. Operational Projects.
3. Research Projects.

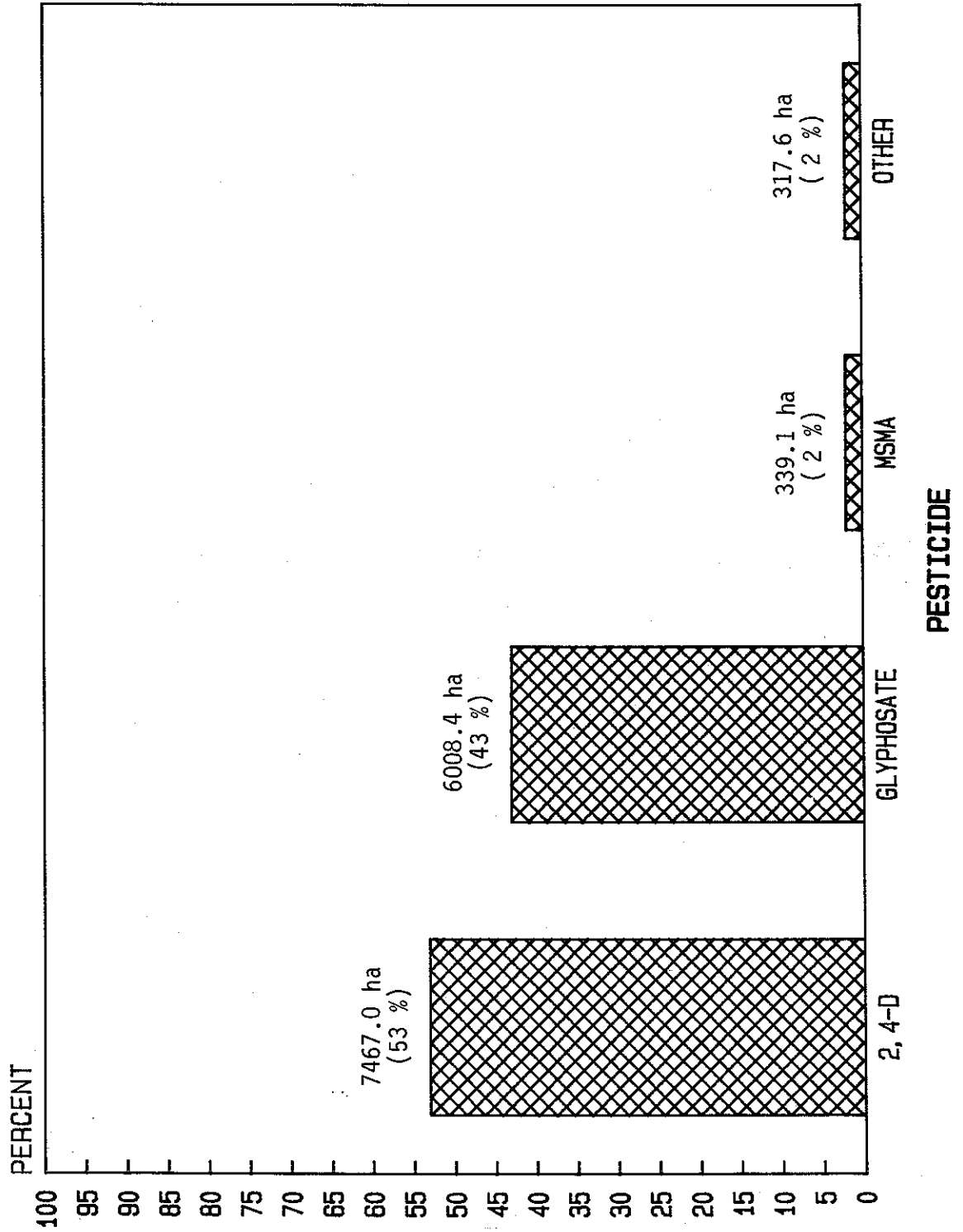
TABLE III. SUMMARY OF PESTICIDE USE<sup>1</sup>, 1984

| PESTICIDE                | B.C. FOREST SERVICE           |                  |                   | FOREST INDUSTRY  |                    |     |
|--------------------------|-------------------------------|------------------|-------------------|------------------|--------------------|-----|
|                          | ha treated<br>OP <sup>2</sup> | RES <sup>3</sup> | kg a.i.<br>OP RES | ha treated<br>OP | kg. a.i.<br>OP RES |     |
| OXYDEMETON<br>- METHYL   | 0                             | 1.5              | 0 1.9             | 0                | 0 0                | 0   |
| OXYFLUORFEN              | 0                             | 0                | 0 0               | 0                | 1.5 0              | 0.5 |
| PERMETHRIN               | 6.0                           | 0                | 0.4 0             | 0                | 0 0                | 0   |
| PICLORAM                 | 197.2                         | 0.5              | 128.4 0.5         | 0                | 0 0                | 0   |
| PUTRESCENT<br>EGG SOLIDS | 3.5                           | 0                | 3.1 0             | 0                | 0 0                | 0   |
| THIRAM                   | 0                             | 0                | 0 0               | 2.0              | 0 2.2              | 0   |
| TRICLOPYR                | 0                             | 2.9              | 0 2.1             | 0                | 0.8 0              | 1.4 |
| 2,4-D                    | 2437.9                        | 0.6              | 3016.8 0.8        | 5028.5           | 0 4242.5           | 0   |

- 12 -

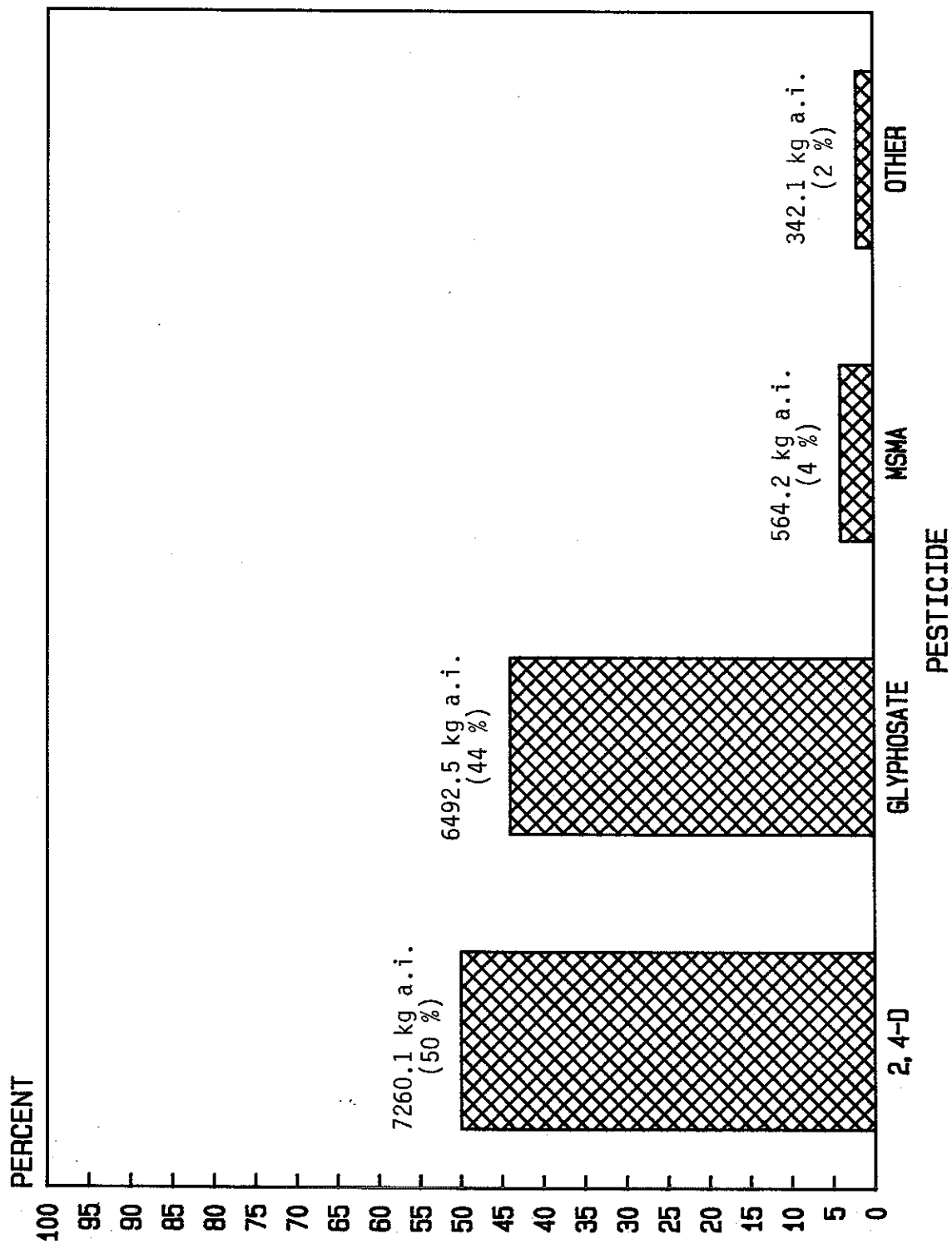
1. Data presented includes pesticides applied to rangeland administered by the B.C. Forest Service.
2. Operational Projects.
3. Research Projects.

FIGURE 3. PERCENT PESTICIDE USE BY AREA TREATED, 1984 <sup>1</sup>



<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

FIGURE 4. PERCENT PESTICIDE USE BY WEIGHT OF ACTIVE INGREDIENT, 1984 <sup>1</sup>



<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

TABLE IV. SUMMARY OF PESTICIDE USE BY FOREST REGION, 1984

| PESTICIDE  | HECTARES TREATED               |                 |                       |       |                       |       |                |     |                  |      |                 |    |
|------------|--------------------------------|-----------------|-----------------------|-------|-----------------------|-------|----------------|-----|------------------|------|-----------------|----|
|            | Vancouver<br>BCFS <sup>1</sup> | FI <sup>2</sup> | Prince Rupert<br>BCFS | FI    | Prince George<br>BCFS | FI    | Nelson<br>BCFS | FI  | Kamloops<br>BCFS | FI   | Cariboo<br>BCFS | FI |
| ASULAM     | 3.7                            | 0.1             | 0                     | 0     | 0                     | 0     | 0.5            | 0   | 0                | 0    | 0               | 0  |
| BENOMYL    | 0.5                            | 0               | 0                     | 0     | 0                     | 0     | 0              | 0   | 0                | 0    | 0               | 0  |
| CARBARYL   | 0                              | 0               | 0                     | 30.0  | 0                     | 0     | 0              | 0   | 0                | 0    | 0               | 0  |
| CARBOFURAN | 0.5                            | 0               | 0                     | 0     | 0                     | 0     | 0              | 0   | 0                | 0    | 0               | 0  |
| DPX-T6376  | 0.04                           | 0               | 0                     | 0     | 0                     | 0     | 0              | 0   | 0                | 0.04 | 0               | 0  |
| FERBAM     | 0                              | 0               | 0                     | 0     | 0                     | 0     | 0              | 0   | 0.5              | 0    | 0               | 0  |
| FOSAMINE   | 20.1                           | 24.9            | 0                     | 0     | 0                     | 0     | 0              | 0   | 0                | 0    | 0               | 0  |
| GLYPHOSATE | 2546.6                         | 1966.1          | 88.5                  | 214.4 | 668.7                 | 298.9 | 214.2          | 8.0 | 2.5              | 0.5  | 0               | 0  |
| HEXAZINONE | 0.1                            | 0.6             | 0                     | 6.8   | 0                     | 12.0  | 0.4            | 0   | 0                | 0.9  | 0               | 0  |
| MSMA       | 0                              | 145.4           | 0                     | 0     | 6.0                   | 2.7   | 185.0          | 0   | 0                | 0    | 0               | 0  |

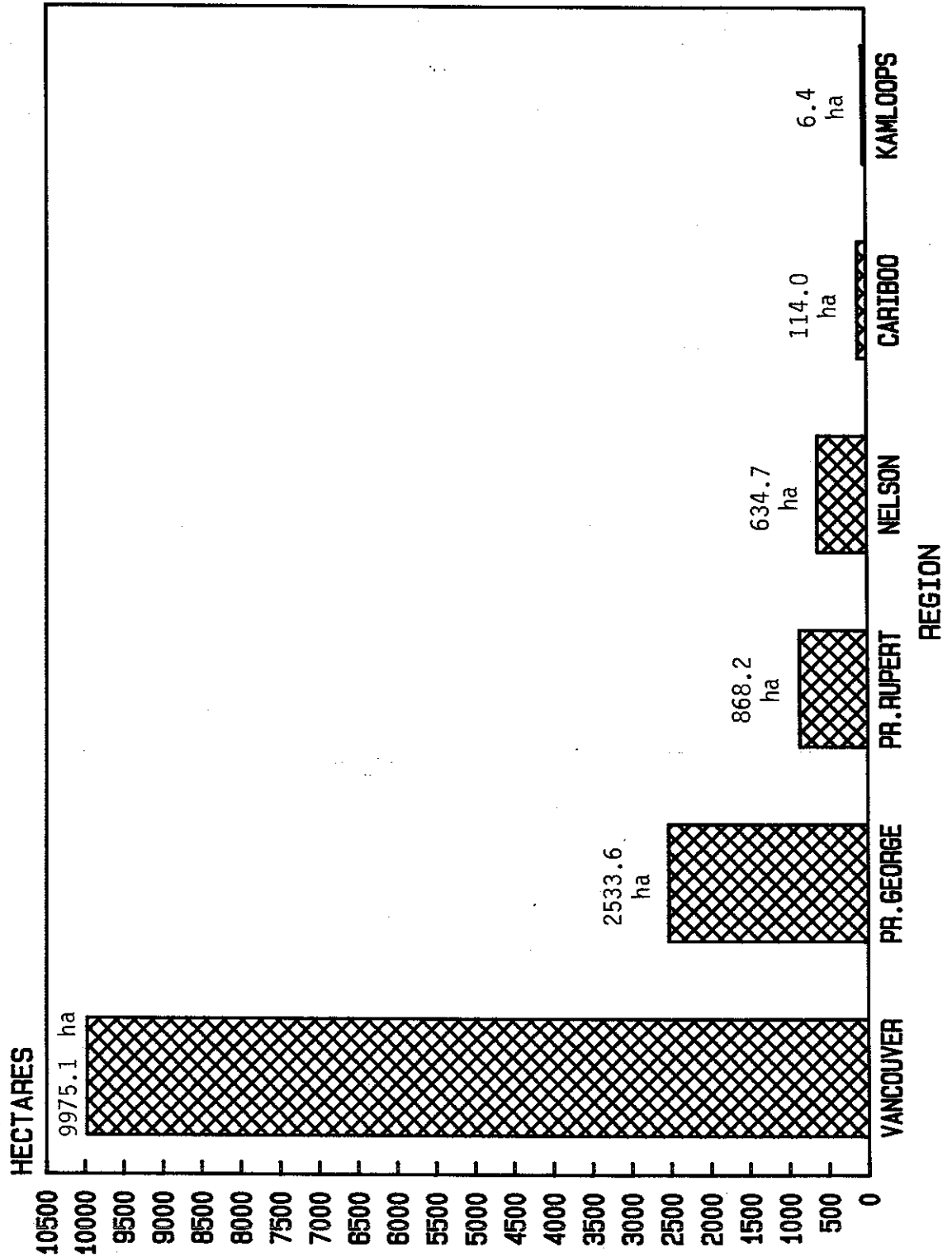
1. B.C. Forest Service
2. Forest Industry

TABLE IV. SUMMARY OF PESTICIDE USE BY FOREST REGION 1984

| PESTICIDE                            | HECTARES TREATED               |                 |                       |    |                       |        |                |       |                  |     |                 |    |
|--------------------------------------|--------------------------------|-----------------|-----------------------|----|-----------------------|--------|----------------|-------|------------------|-----|-----------------|----|
|                                      | Vancouver<br>BCFS <sup>1</sup> | FI <sup>2</sup> | Prince Rupert<br>BCFS | FI | Prince George<br>BCFS | FI     | Nelson<br>BCFS | FI    | Kamloops<br>BCFS | FI  | Cariboo<br>BCFS | FI |
| OXYDEMETON-METHYL                    | 1.5                            | 0               | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 0   | 0               | 0  |
| OXYFLUORFEN                          | 0                              | 0               | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 1.5 | 0               | 0  |
| PERMETHRIN                           | 0                              | 0               | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 0   | 6.0             | 0  |
| PICLORAM                             | 0                              | 0               | 0.5                   | 0  | 7.4                   | 0      | 81.8           | 0     | 0                | 0   | 108.0           | 0  |
| PUTRESCENT EGG<br>SOLIDS (DEER-AWAY) | 3.5                            | 0               | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 0   | 0               | 0  |
| THIRAM                               | 0                              | 2.0             | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 0   | 0               | 0  |
| TRICLOPYR                            | 2.9                            | 0.8             | 0                     | 0  | 0                     | 0      | 0              | 0     | 0                | 0   | 0               | 0  |
| 2,4-D                                | 1824.9                         | 3430.9          | 528.0                 | 0  | 62.1                  | 1475.8 | 23.0           | 121.8 | 0.5              | 0   | 0               | 0  |

1. B.C. Forest Service  
2. Forest Industry

FIGURE 5. AREA TREATED WITH PESTICIDES BY FOREST REGION, 1984 <sup>1</sup>



<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

TABLE V. HERBICIDE USE BY CONTROL PURPOSE, 1984

| PURPOSE                    | HERBICIDES<br>USED | B.C. FOREST SERVICE<br>ha<br>treated | kg<br>a.i. used | FOREST INDUSTRY<br>ha<br>treated | kg<br>a.i. used |
|----------------------------|--------------------|--------------------------------------|-----------------|----------------------------------|-----------------|
| BRUSHING AND<br>WEEDING    | asulam             | 3.7                                  | 7.9             | 0.1                              | 0.2             |
|                            | DPX-T6376          | 0                                    | 0               | 0.04                             | 0.01            |
|                            | glyphosate         | 868.1                                | 1183.6          | 861.8                            | 813.1           |
|                            | hexazinone         | 0.4                                  | 2.4             | 19.0                             | 60.3            |
|                            | oxyfluorfen        | 0                                    | 0               | 1.5                              | 0.5             |
|                            | picloram           | 1.7                                  | 1.8             | 0                                | 0               |
|                            | triclopyr<br>2,4-D | 2.9<br>761.8                         | 2.1<br>948.7    | 0.6<br>1632.9                    | 0.8<br>128.2    |
| CONIFER RELEASE            | asulam             | 0.5                                  | 1.1             | 0                                | 0               |
|                            | glyphosate         | 2029.3                               | 2341.5          | 1436.1                           | 1248.3          |
|                            | hexazinone         | 0.1                                  | 0.1             | 1.3                              | 1.6             |
|                            | triclopyr          | 0                                    | 0               | 0.2                              | 0.6             |
|                            | 2,4-D              | 1375.9                               | 1875.8          | 2631.7                           | 2915.6          |
| NOXIOUS WEED<br>CONTROL    | picloram           | 196.0                                | 127.0           | 0                                | 0               |
| PRE-COMMERCIAL<br>THINNING | glyphosate<br>MSMA | 0<br>0                               | 0<br>0          | 0.5<br>145.4                     | 0.4<br>561.6    |

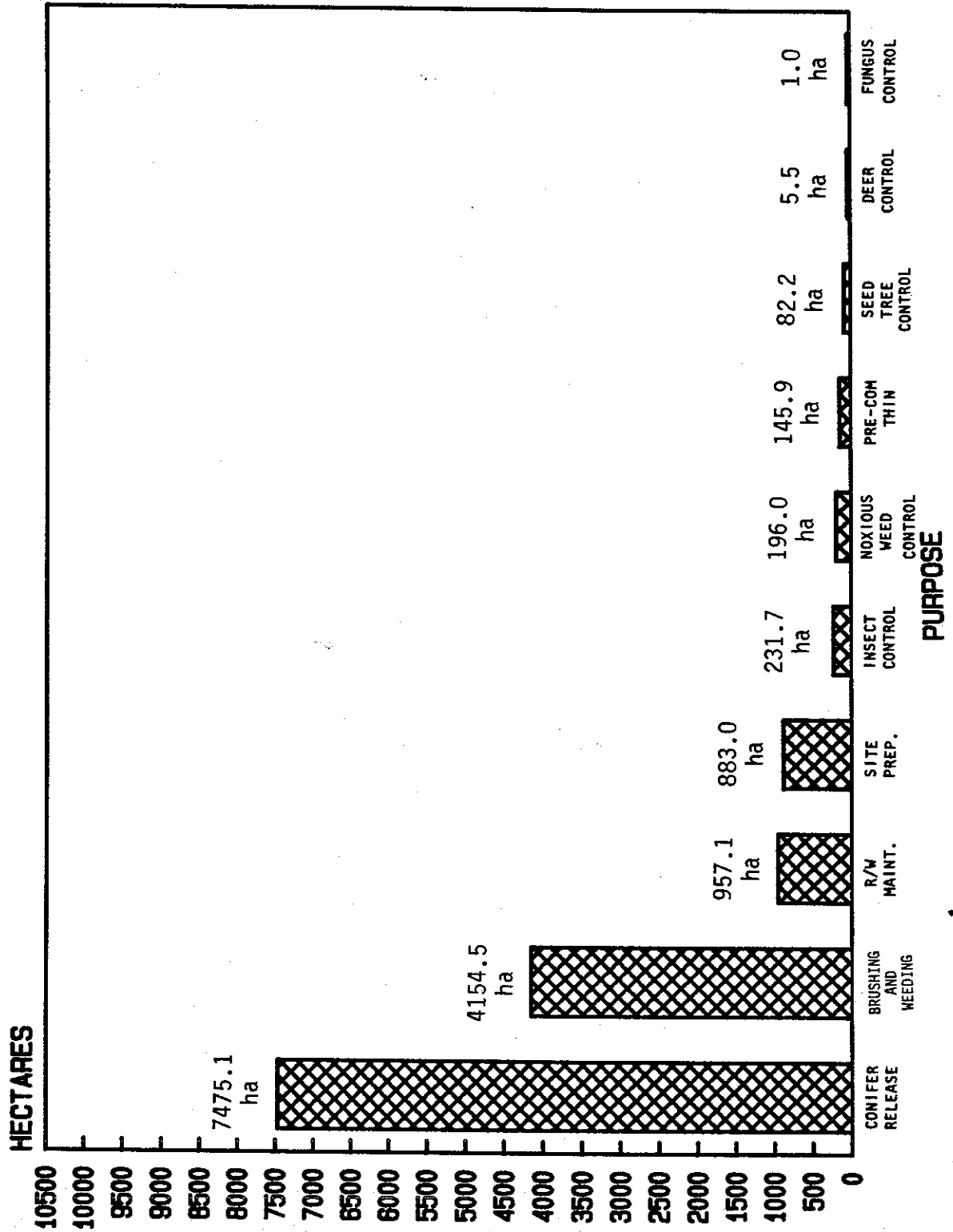
TABLE V. HERBICIDE USE BY CONTROL PURPOSE, 1984

| PURPOSE                     | HERBICIDES<br>USED               | B.C. FOREST SERVICE<br>ha<br>treated | a.i. used<br>kg | FOREST INDUSTRY<br>ha<br>treated | a.i. used<br>kg |
|-----------------------------|----------------------------------|--------------------------------------|-----------------|----------------------------------|-----------------|
| RIGHT-OF-WAY<br>MAINTENANCE | fosamine<br>glyphosate<br>2,4-D  | 20.1                                 | 75.4            | 24.9                             | 21.0            |
|                             |                                  | 20.5                                 | 29.5            | 128.5                            | 234.3           |
|                             |                                  | 100.4                                | 91.4            | 662.7                            | 1161.0          |
| SEED TREE CONTROL           | glyphosate<br>2,4-D              | 46.0                                 | 4.4             | 0                                | 0               |
|                             |                                  | 5.0                                  | 3.8             | 31.2                             | 27.8            |
| SITE PREPARATION            | DPX-T6376<br>glyphosate<br>2,4-D | 0.04                                 | 0.005           | 0                                | 0               |
|                             |                                  | 556.6                                | 608.3           | 61.0                             | 20.8            |
|                             |                                  | 195.4                                | 98.1            | 70.0                             | 18.2            |

TABLE VI. INSECTICIDE AND OTHER TYPES OF PESTICIDE USE BY CONTROL PURPOSE, 1984

| PURPOSE               | INSECTICIDES AND<br>OTHER PESTICIDES<br>USED | B.C. FOREST SERVICE<br>ha<br>treated | kg<br>a.i. used | FOREST INDUSTRY<br>ha<br>treated | kg<br>a.i. used |
|-----------------------|----------------------------------------------|--------------------------------------|-----------------|----------------------------------|-----------------|
| INSECT CONTROL        | carbaryl                                     | 0                                    | 0               | 30.0                             | 30.0            |
|                       | carbofuran                                   | 0.5                                  | 0.8             | 0                                | 0               |
|                       | MSMA                                         | 191.0                                | 1.5             | 2.7                              | 1.1             |
|                       | oxydemeton-methyl                            | 1.5                                  | 1.9             | 0                                | 0               |
|                       | permethrin                                   | 6.0                                  | 0.4             | 0                                | 0               |
| FUNGUS CONTROL        | benomyl                                      | 0.5                                  | 0.6             | 0                                | 0               |
|                       | ferbam                                       | 0.5                                  | 0.1             | 0                                | 0               |
| VERTEBRATE<br>CONTROL | putrescent egg<br>solids (Deer-away)         | 3.5                                  | 3.1             | 0                                | 0               |
|                       | thiram                                       | 0                                    | 0               | 2.0                              | 2.2             |

FIGURE 6. SUMMARY OF THE PURPOSE OF PESTICIDE USE BY AREA TREATED, 1984 <sup>1</sup>



<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

TABLE VII. PESTICIDE USE BY METHOD OF APPLICATION, 1984

| METHOD OF APPLICATION                                                    | PESTICIDES USED                                                                                                                                                       | B.C. FOREST SERVICE<br>ha TREATED                                             | FOREST INDUSTRY<br>ha TREATED                                                  |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| AERIAL SPRAY<br>HELICOPTER                                               | glyphosate<br>hexazinone<br>2,4-D                                                                                                                                     | 2133.0<br>0<br>15.0                                                           | 601.9<br>12.0<br>0                                                             |
| BACKPACK<br>(KNAPSACK)<br>SPRAYERS                                       | asulam<br>carbaryl<br>carbofuran<br>DPX T6367<br>glyphosate<br>hexazinone<br>oxydemeton-methyl<br>permethrin<br>putrescent egg solids<br>thiram<br>triclopyr<br>2,4-D | 4.2<br>0<br>0.5<br>0<br>335.6<br>0.5<br>0.5<br>6.0<br>3.5<br>0<br>2.9<br>69.6 | 0.1<br>30.0<br>0<br>0.04<br>207.4<br>1.0<br>0<br>0<br>0<br>2.0<br>0.8<br>508.1 |
| TREE INJECTION<br>TREATMENTS<br>(CUT SURFACE)<br>TREATMENTS <sup>1</sup> | glyphosate<br>hexazinone<br>MSMA<br>oxydemeton-methyl<br>2,4-D                                                                                                        | 749.7<br>0<br>191.0<br>0.5<br>2290.6                                          | 1551.1<br>7.3<br>148.1<br>0<br>4292.7                                          |

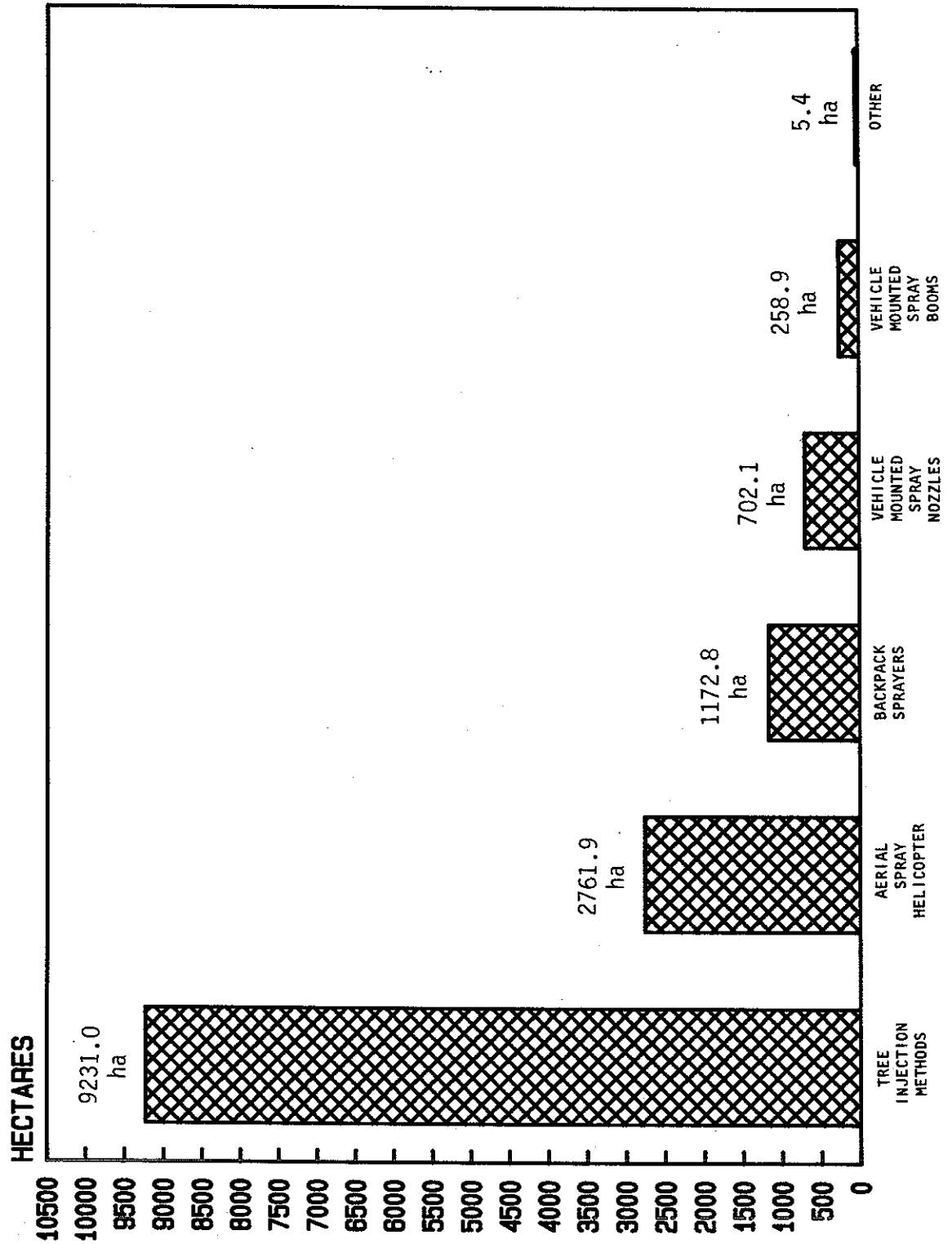
1. Involves hack and squirt, frill and squirt and cut stump treatments. May employ brush saws, injectors, spot guns, etc.

TABLE VII. PESTICIDE USE BY METHOD OF APPLICATION, 1984

| METHOD OF APPLICATION                         | PESTICIDES USED | B.C. FOREST SERVICE<br>ha TREATED | FOREST INDUSTRY<br>ha TREATED |
|-----------------------------------------------|-----------------|-----------------------------------|-------------------------------|
| VEHICLE MOUNTED<br>SPRAY BOOMS <sup>2</sup>   | glyphosate      | 25.0                              | 127.5                         |
|                                               | oxyfluorfen     | 0                                 | 1.5                           |
|                                               | 2,4-D           | 18.9                              | 86.0                          |
| VEHICLE MOUNTED<br>SPRAY NOZZLES <sup>3</sup> | benomyl         | 0.5                               | 0                             |
|                                               | DPX T6376       | 0.04                              | 0                             |
|                                               | ferbam          | 0.5                               | 0                             |
|                                               | fosamine        | 20.1                              | 24.9                          |
|                                               | glyphosate      | 277.0                             | 0                             |
|                                               | picloram        | 196.0                             | 0                             |
|                                               | 2,4-D           | 44.4                              | 138.7                         |
| OTHER                                         | carbofuran      | 0.2                               | 0                             |
|                                               | glyphosate      | 0.5                               | 0                             |
|                                               | hexazinone      | 0.5                               | 0                             |
|                                               | picloram        | 1.2                               | 0                             |
|                                               | 2,4-D           | 0                                 | 3.0                           |

2. Any fixed system which involves a boom with one or more nozzles attached to create a continuous broadcast spray. (Source: Ministry of Environment, Pesticide Control Branch).
3. Any system which involves tank, hose and nozzle. Nozzle is hand held and can be selectively directed. (Source: Ministry of Environment, Pesticide Control Branch)

FIGURE 7. SUMMARY OF METHODS OF PESTICIDE APPLICATION BY AREA TREATED, 1984 <sup>1</sup>



<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

TABLE VIII. AREAS TREATED BY FOREST INVENTORY TYPE IDENTITY, 1984

| TYPE IDENTITY <sup>1</sup>   | HECTARES TREATED    |                 | TOTAL  |
|------------------------------|---------------------|-----------------|--------|
|                              | B.C. FOREST SERVICE | FOREST INDUSTRY |        |
| IMMATURE                     | 4487.9              | 5058.7          | 9546.6 |
| MATURE                       | 196.1               | 150.7           | 346.8  |
| RESIDUAL                     | 339.9               | 1660.3          | 2000.2 |
| NON SATISFACTORILY RESTOCKED | 1019.4              | 78.5            | 1097.9 |
| NON-COMMERCIAL               | 0                   | 0.5             | 0.5    |
| NON-FOREST                   | 0                   | 0               | 0      |
| DISTURBED, STOCKING DOUBTFUL | 3.0                 | 0               | 3.0    |
| NOT APPLICABLE <sup>2</sup>  | 341.7               | 795.4           | 1137.1 |

1. Reference: Province of British Columbia, Ministry of Forests, May, 1979. Silviculture Manual, Chapter 4, Appendix 4 - 6.
2. Represents all pesticide applications to rangeland, roadsides and forest nurseries and seed orchards.

FIGURE 8. AREA OF FOREST TYPE IDENTITY TREATED WITH PESTICIDES, 1984

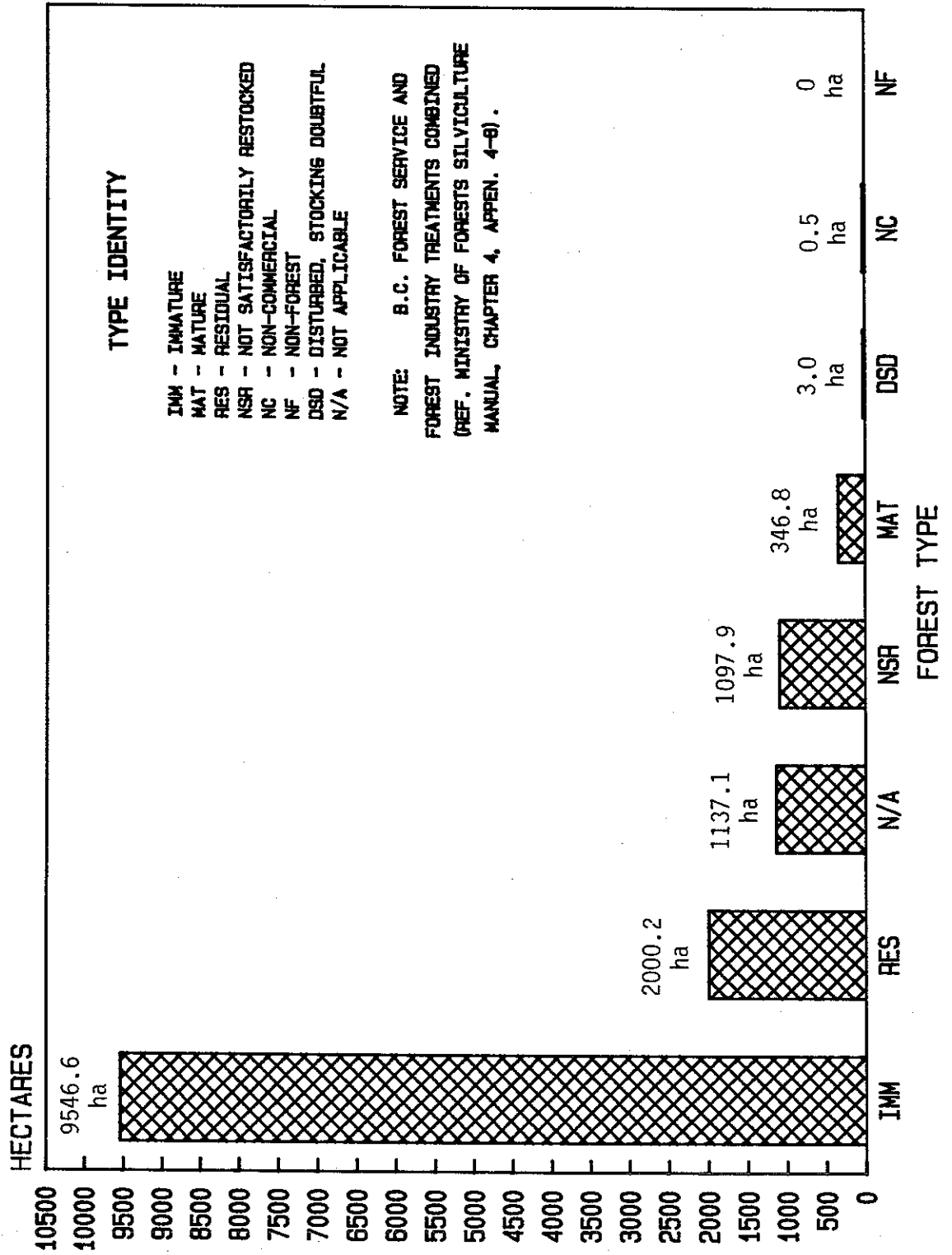
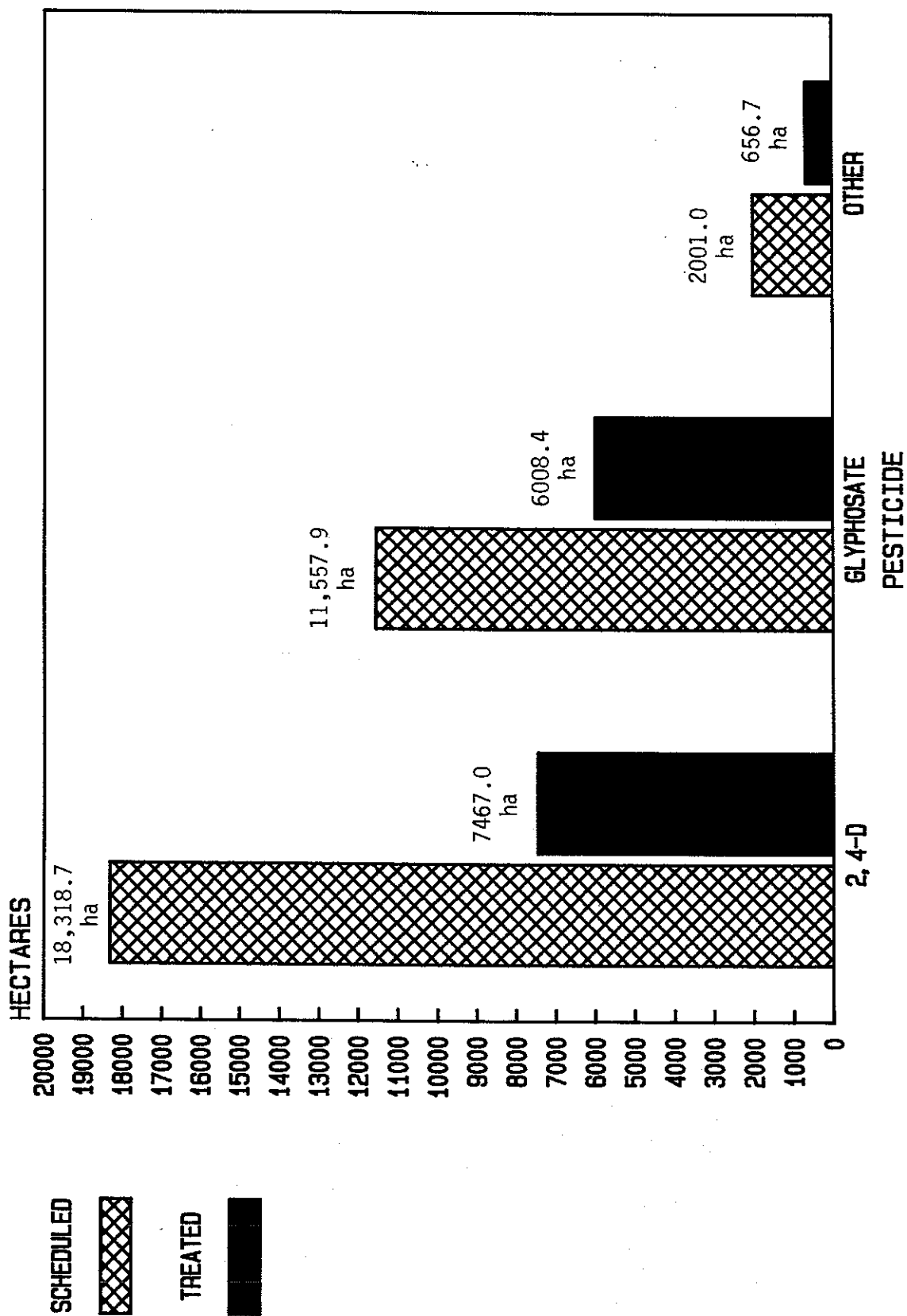


TABLE IX. COMPARISON OF AREAS SCHEDULED FOR PESTICIDE TREATMENT WITH AREAS ACTUALLY TREATED, 1984

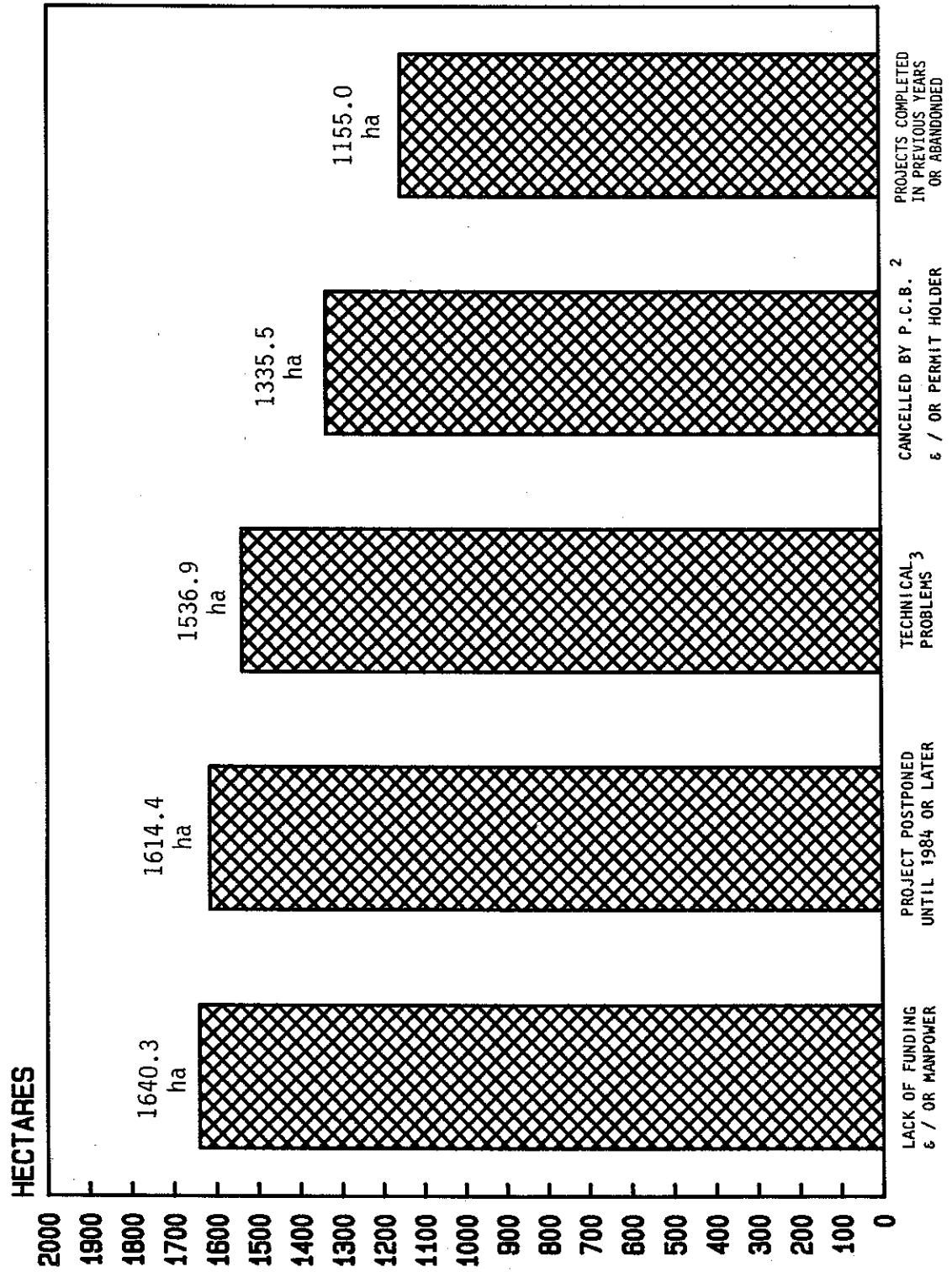
| PESTICIDE  | B.C. FOREST SERVICE                    |                                 | FOREST INDUSTRY                        |                                 |
|------------|----------------------------------------|---------------------------------|----------------------------------------|---------------------------------|
|            | Hectares<br>scheduled for<br>treatment | Hectares<br>actually<br>treated | Hectares<br>scheduled for<br>treatment | Hectares<br>actually<br>treated |
| GLYPHOSATE | 4925.5                                 | 3520.5                          | 6632.4                                 | 2487.9                          |
| 2,4-D      | 6830.8                                 | 2438.5                          | 11,487.9                               | 5028.5                          |
| OTHERS     | 1453.2                                 | 428.9                           | 547.8                                  | 227.8                           |
| TOTALS     | 13,209.5                               | 6387.9                          | 18,668.1                               | 7744.2                          |

FIGURE 9. COMPARISON OF AREA SCHEDULED FOR PESTICIDE TREATMENTS WITH AREA ACTUALLY TREATED, 1984<sup>1</sup>



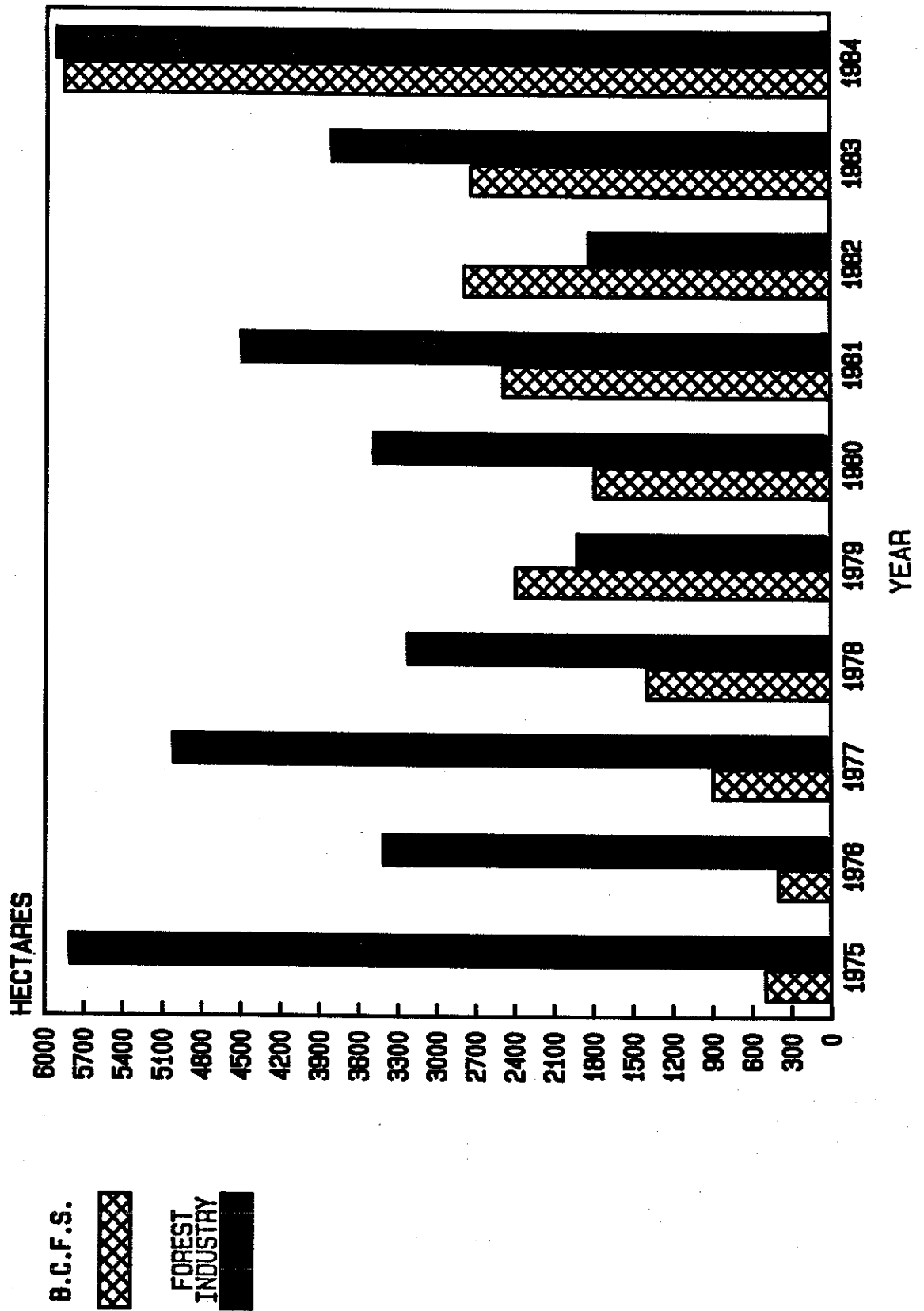
<sup>1</sup> B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED

FIGURE 10. REASONS FOR PESTICIDE USE PERMIT NON-UTILIZATION BY AREA AFFECTED, 1984 <sup>1</sup>



1. B.C. FOREST SERVICE & B.C. FOREST INDUSTRY COMBINED.  
 2. P.C.B. - PESTICIDE CONTROL BRANCH, B.C. MINISTRY OF ENVIRONMENT.  
 3. INCLUDES ADVERSE WEATHER, EQUIPMENT PROBLEMS, ETC.

FIGURE 11. TOTAL HECTARES OF LAND TREATED WITH HERBICIDES FOR FORESTRY PURPOSES, 1975-1984



### DISCUSSION AND CONCLUSIONS

Pesticide, particularly herbicide, use in B.C. forestry seems to be following an upward trend.

Forestry pesticide use permits issued by the Pesticide Control Branch have roughly tripled since 1983, and overall areas treated with herbicides has approximately doubled.

This dramatic increase in herbicide use can be partially attributed to the registration of glyphosate which has widened the scope of vegetation management for B.C. foresters involved in stand tending and site preparation operations.

Other types of pesticides, such as insecticides and fungicides are still, and likely will continue to be, of minimal or sporadic use in B.C. forestry.

It is anticipated, however, that future annual pesticide use surveys will continue to reflect an increase in forestry herbicide use.

ACKNOWLEDGEMENTS

The author would again like to thank Ministry of Environment, Pesticide Control Branch personnel for their help in establishing an ongoing pesticide use survey and improving our records of forestry pesticide data. Thanks also go to all industry foresters and B.C. Forest Service personnel for their continued contribution to these records.