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Province of
British Columbia
Ministry of
Forests and Lands

PEST MANAGEMENT PROGRESS

A summary of pest management activities in the British Columbia Ministry of Forests and Lands.

Volume VII, Number 1 (File 190-4 PMP) May 1988

Announcing a Pest Management Road Show

A special one day seminar and workshop has been developed for practitioners in forest management to augment knowledge of local pests and to outline concepts, practices and experiences. The session has been developed particularly for forest industry (Division Managers, Area Foresters and their field staff) and Forest Service personnel (District Management, Resource Officers, Resource Assistants).

The focus for the event will be the Forest Service Protection Manual, Volume II, Pest Management. Emphasis will be placed on the benefits, expectations and results from implementation and integration of the pest management component of a forest management plan. The seminar and workshop are closely connected to emphasize both opportunities and responsibilities. Included in the agenda are presentations on:

- Historical review, current status
- Understanding pests and pest management
- The four cornerstones
- Roles and responsibilities
- Relationships and connections
- Needs and expectations
- Using the Manual
- Activities at the Regional Office
- Experiences at the District Office
- Benefits to the forest industry

Following the presentations, discussion groups will be formed to review local activities and opportunities and explore avenues for follow-up. The session will close with an appropriate summation and written critique.

Speakers and discussion leaders will include specialists and managers from Forest Service and forest company offices, and, on occasion, special guests to address particular concerns. The seminar/workshop will be organized by Regional Offices and Protection Branch to satisfy needs and interests of District Offices and forest products companies. The session is available upon request anywhere in the province; six weeks notice would be appreciated.

The seminar/workshop has been endorsed by the Professional Pest Management Association and the Council of Forest Industries. Continuing education credits are offered members of the Applied Science Technologists and Technicians and the Association of B.C. Professional Foresters. Please contact me for a booking in your town.

- R. F. DeBoo, Protection Branch, Victoria.

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PEST MANAGEMENT PROGRESS

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PUBLISHER'S AND EDITOR'S NOTE

Pest Management Progress is intended to provide factual information on projects and proposals by Ministry staff.

Contributions labelled with an appropriate subject heading should be submitted to the Regional Protection Officer or Advisor who will edit and forward them to Protection Branch. PMP is submitted to the spring (May) and winter (December) meetings of the B.C. Forest Pest Review Committee.

Authors should be contacted for any further clarification as the contents of this report do not necessarily constitute official statements of the Ministry of Forests and Lands.

PEST MANAGEMENT GENERAL

Protection Manual Volume II Update. Four more chapters have been completed and submitted to the Queen's Printer for printing. Distribution to Manual holders is expected in May. These are:

Chapter 7 - Stem, Canker and Foliage Diseases
Chapter 8 - Wood Decay
Chapter 14 - Use and Regulation of Pesticides in Forest Management
Chapter 20 - Selected Literature and Other References

Completing the Pest Management Volume is expected before the end of this fiscal year. Suggestions and comments from users would be appreciated.

- R. F. DeBoo, Protection Branch, Victoria.

What is a Pest? Have you ever wondered why:

- Wildlife biologists, when hunting wolves, call it predator control;
- Sportsmen, when deer hunting, tell us they are participating in wildlife population management;
- Fisheries biologists, when applying a piscicide (pesticide) to eliminate undesirable fish species, are enhancing sports-fisheries habitat;
- Sealers, when harvesting fur seals, are contributing to the reduction of pressures on off-shore fisheries, and therefore to the welfare of fisherman;
- Foresters, in their efforts to establish crop trees on difficult sites, consider their work with herbicides to control undesirable plants a form of vegetation management?

If wolves, carp, suckers, seedling-killing deer, fish-eating seals, weeds, and brush, aren't "pests," is there a message somewhere here for the rest of us?

- R. F. DeBoo and J. F. Henigman, Protection Branch, Victoria.

Forest Insect and Disease Impacts in Timber Supply Areas (T.S.A.s) and Tree Farm Licences (T.F.L.s). The purpose of this summary report now in preparation is to collect and make available data using standardized methods on known and potential pest problems to:

- identify opportunities and research needs;
- identify pest issues for consideration in the T.S.A/T.F.L. analysis;
- develop priorities, e.g. research;
- test potential damage appraisal models, e.g. C.F.S. models on white pine weevil and western spruce budworm; and
- catalogue information on pest impacts and methods.

Future uses of the document include direct applications in yield estimates and allocating budgets, but methods and impacts must be further developed. One exception, the Vancouver Forest Region's laminated root rot equations, have been used in yield estimates for the Sunshine T.S.A. and will be used at renewal time for this Region's remaining T.S.A.s.

The T.F.L. campanion to the T.S.A. compilation is currently under development. Impacts have been calculated for most interior T.F.L.s and data is currently being assembled for coastal ones. Completion of this component of the project is scheduled for July, 1988.

- S. P. Taylor, Protection Branch, Victoria.

Pest Content in Planning Documents. T.S.A. and T.F.L. plans are being reviewed by Pest Management staff with the objective of correcting their limitations in pest content. These deficiencies include:

- poor identification of pest opportunities for increasing yields due to improved management techniques;

- a lack of strategies for pests which are considered important Regionally; and

- a creative approach to Pest Management.

Increased emphasis on the identification of pest opportunities in planning documents will lead to a more rational allocation of budgets. Currently, missed opportunities on dwarf mistletoe and white pine weevil sites, for example, are preventing optimum growth and harvest.

- S. P. Taylor, Protection Branch, Victoria.

Pest Content in Planning Development. Timber supply Area (TSA) and Tree Farm Licence (TFL) plans are being reviewed to hopefully improve the pest management content and, as a result, the opportunities to deal with pests as well. Three benefits are perceived: (1) through better identification of pest occurrence and management opportunities, increased yields resulting from better management, (2) through the development of an array of strategies to deal with pests, deployment of activities in silvicultural, and harvesting, a protection program to limit pest impacts, and (3) through an improved planning process, develop a proactive approach to pest management.

It is expected that emphasis on the early identification of pest management opportunities in TFL and TSA documents will lead to improved allocation in operational budgets. Please contact the undersigned for additional information.

- S. P. Taylor, Protection Branch, Victoria.

Pest Control Projects - FRDA. Several additional Pest Control projects were completed by March 31, 1988, under the Forest Resources Development Agreement (FRDA). These included:

(1) work on pest effects on Timber Supply Area timber yields by D. Errico, Research Branch (in progress);

(2) workshops on the applicability of a U.S. Forest Service root disease model to southern interior B.C. (completed. See "Publications and Reports."); and

(3) analysis of the effects of lodgepole pine dwarf mistletoe on tree form, based on 80 sectioned trees near Prince George (report in preparation).

Projects planned for 1988/89 include damage appraisals of root diseases, dwarf mistletoe, and air pollution; and trials or demonstrations of control treatments for porcupines, stem diseases, leader weevil, and root diseases. Project work plans are being developed by Regional staff, and are described in this issue of PMP.

- J. Muir, Protection Branch, Victoria.

F.R.D.A. Extension, Demonstration, Research and Development (shareable) Sub-Program. Two new studies of methods of controlling mammal damage will be funded by F.R.D.A. during 1988/89. These projects will address snowshoe hare, meadow vole, and lemming damage to coniferous plantations in the Prince George and Prince Rupert Forest Regions. The studies, to be conducted by Dr. Tom Sullivan of Applied Mammal Research Institute, will assess 1) the effectiveness of glyphosate herbicide in altering habitat to make it less attractive to hares and small mammals, and 2) the use of encapsulated predator odours as repellents to reduce feeding damage on seedings. Both will continue through to the end of F.R.D.A. in 1990.

- B. Nyberg, Research Branch, Victoria.

Total Pest Assessments of Existing Permanent Sample Plots (P.S.P.). The Kamloops Forest Region has undertaken the task of visiting all established P.S.P.'s in their Region and doing a total pest assessment of these plots. All P.S.P.'s were sorted by biogeoclimatic zone; species composition and age; stand history; and date of establishment. The survey will identify any diseases or insects present in the plots, the incidence of each disease/insect, and specific details of the impact those pests are having on the trees in the plots.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Co-op Students Hired for Special Pest Surveys in the Prince Rupert Forest Region. Four Co-op students will be hired for special pest management projects this summer in the Prince Rupert Forest Region. Two SFU students have been hired by the Morice Forest District to participate in many summer MPB control activities including pheromone baiting, sketch mapping, flight monitoring using Lindgren funnel traps and applying MSMA. Two students, one each from UVIC and SFU, have been hired by Regional Pest Management staff to conduct several special pest surveys directed primarily at young stands. These surveys may include assessing the extent of damage caused by voles, rusts and cankers, tomentosus root rot, root collar weevil and spruce leader weevil. Of particular interest is a survey of the Region's 257 growth and yield plots for pest damage.

Other sections in the Region have also hired Co-op students for a wide variety of special activities in research, fire preparedness and range. We anticipate that these students will supply us with a vast quantity of valuable information and we hope to provide them with equally valuable experience as an introduction to life in the Forest Service.

- T. Ebata, Prince Rupert Forest Region, Smithers.

Reprinting of Pest Identification Field Guide. The Prince Rupert Forest Region pest field guide is now available for those interested in obtaining copies.

- W. Martin, Prince Rupert Forest Region, Smithers.

Pest Identification Training Sessions. Field staff of the Bulkley Forest District received training in late February and two sessions are planned for this year: Kispiox Forest District - April 19th and Morice Forest District - June 14th. Training in pest identification will continue on an annual basis depending on Districts needs. All Districts in the Prince Rupert Forest Region will have received pest I.D. training after completion of the Kispiox session.

- W. Martin, Prince Rupert Forest Region, Smithers.

Pest Management Displays. New pest management display material includes a second mini-display for which two presentations are available; general pest management and the gypsy moth. These mini-displays are well-suited for table top presentations at small meetings. Other pest management promotional material including the mountain pine beetle model, forestry computer games and large scale displays on mountain pine beetle, root rots, Douglas-fir tussock moth, general pest management, gypsy moth and pesticides was exhibited at 12 locations, in the last 6 months.

- S. P. Taylor, Protection Branch, Victoria.

Forest Nursery Update. With the planned privitization of nine Ministry nurseries, Silviculture Branch has been restructured, and a new Nursery and Seed Extension Services Unit has been formed. This includes extension personnel, planning staff and the Nursery Administrative Officers. The extension services group now consists of three nursery specialists and Don Summers, the Seed Orchard Pest Management Specialist. We look forward to cooperating with Don in the future.

Under FRDA project NITAC 1.47, a large pesticide trial with the herbicides Goal (oxyfluorfen) and Devrinol (napropamide) and the fungicide Benlate (benomyl) is being conducted at Surrey Nursery. The purpose of the project is to conduct the container portion of a standard Canada-wide Goal trial designed to gain a registration for the use of Goal in Canada. At the same time, Devrinol, which has recently been registered for use in nurseries, will be tested to extend the species on the label and develop specific use patterns for nursery stock. Root rots namely Pythium, Cylindrocarpon, Pythophthora and Fusarium are becoming significant problems in container stock. A trial with the fungicide Benlate will be conducted to gain a registration for control of Fusarium.

Trials to develop an effective control program for the balsalm wooly aphid, in cooperation with Rona Sturrock at Pacific Forestry Centre, will continue. This summer different timings, rates, volumes, and application methods for Safers Insecticidal Soap will be tested. Also in cooperation with the staff at the Nursery Pest Clinic, the Diseases and Insect Pests in British Columbia Forest Nurseries Guide is being updated under FRDA project 2.48.

A survey for the pine needle mite Trisetacus campnodus is planned in cooperation with Regional staff. Infected seedlots have been identified from the nurseries and these lists will be forwarded to the appropriate Regions to see if this pest has become a problem in the planting sites.

Populations of springtails (or Collembola) appear to be increasing in container facilities and several growers have been concerned over their numbers. Surveys to collect and identify these populations will be conducted in cooperation with Valin Marshall at Pacific Forestry Centre.

- G. Shrimpton, Silviculture Branch, Surrey.

Porcupine Update. Porcupine damage surveys in spaced stands were recently completed in the Kalum Forest District. Thirty-two km of line was re-surveyed and 17.5 km of new line was established, with a total sampling population of 8621 stems. Current attack levels on all stems combined has increased from 0.44% in 1986 to 1.03% in 1987. Current attack on hemlock has increased approximately three-fold from 0.6 to 1.8% over the same time period. These stands are just entering the susceptible size range for porcupine attack and the problem is expected to increase.

The sanitation spacing/collaring Sx/Px trial was established on about 12 hectares in a 35-40 year old western hemlock/amabilis fir stand in the Khutzeymateen Inlet. The block was juvenile spaced in strips 8 m wide, separated by 8 m wide leave strips. Five hundred crop trees per hectare made up of western hemlock, sitka spruce, amabilis fir and western red cedar was the target stocking aimed for within the spaced areas. All Sitka spruce and western hemlock crop trees were pruned and collared within the spaced area. Amabilis fir and western red cedar were left uncollared. All previous surveys prior to 1988 indicated that amabilis fir and western red cedar were not attacked by porcupine in the Khutzeymateen Inlet, except by 'accident.' However, a survey in the spring of 1988 along one of the four permanently established and annually monitored transects indicated significant damage to amabilis fir. Hence, if feeding preference does shift to less preferred species, collaring may be required on all crop trees. This would increase the cost of collaring depending on the proportion of different species.

As collaring is a very expensive option (ie. about $250 per hectare in this trial or about $1.50 per tree), it may only be an option in highly valued stands. However, juvenile spacing costs in the North Coast are often $1,000 per hectare or more, so perhaps an additional $250 per hectare is not too much to consider (vs. the likelihood of NSR).

Permanent sample plots have been established in the unspaced as well as the spaced strips to monitor the effectiveness of the collars in reducing damage to western hemlock and Sitka spruce, and to monitor damage to uncollared western red cedar and amabilis fir.

The re-introduction of the fisher into Khutzeymateen Inlet is still a high priority item. However, despite more than adequate funding, there does not appear to be a supply of fisher to meet our needs. Only one fisher was released into the North Coast this year, despite increased efforts to acquire fisher from trappers in the B.C. Interior.

Attack by porcupine on the four permanently established transects in Khutzeymateen Inlet was as follows:

	1988	1987	
Transect #1	6.5%	5.1%	Control side
2	2.9%	2.2%	$X = 4.4 \pm 7.8$
3	2.1%	6.2%	Fisher side
4	8.3%	20.4%	$X = 4.7 \pm 8.2$

Tom Sullivan's porcupine problem analysis entitled "Impact of the Porcupine Pest Problem on Intensive Forest Management in the Prince Rupert Forest Region" is available. General findings for the Province and recommendations to alleviate damage are provided. It also presents a forecast model to predict when and where damage will occur.

- W. Martin, Prince Rupert Forest Region, Smithers.

Vole Damage on Planted Seedlings in the Prince Rupert Forest Region.
Tom Sullivan's report entitled "Assessment and Management of the Vole Damage Problem in Forest Plantations of the Prince Rupert Region," is available. Twenty-eight plantations were surveyed in four Districts. Percent attack to planted seedlings varied from 17 to 82% with an average of 57% in the Bulkley, 36% in the Morice and 54% in the Lakes Forest Districts. Pine survival was lower than spruce (42 vs. 58%), pine survival was better on burned as compared to patchy or unburned blocks, and planted pine seedlings were favored over naturals. Structural complexity of post-harvest debris appeared to be the critical factor controlling incidence of vole damage. Tom recommended several options to alleviate damage in high risk areas including:

- avoid vole peaks (ie. delay planting),
- plant spruce over lodgepole pine and use large stock,
- modify nursery regime,
- modify vole habitat (burning or herbicides),
- use repellents, and
- provide alternate foods.

Our strategy before the next vole peak is to identify our high risk areas and evaluate the above control options. Tom Sullivan has submitted proposals to investigate some of the above control options.

- W. Martin, Prince Rupert Forest Region, Smithers.

FOREST ENTOMOLOGY

Bark Beetle Program. Approximately $9.6 million were initially allocated to Region projects as reported in the last issue of Pest Management Progress. Activities funded under the program remained the same as in past years. Final expenditure and activity reports are expected to be available early summer, 1988.

The program will continue in the 1988/89 fiscal year, the fifth year of the program. The Provincial allocation is approximately $8.1 million which will be allocated to Regions and Districts on the basis of priorities established through project submission and review.

- P. Hall, Protection Branch, Victoria.

Accomplishments 1984-87 - Special Bark Beetle Funding, Nelson Forest Region. The main emphasis of bark beetle projects carried out under the special Bark Beetle funding over the past four years has been the detection and control of active bark beetle infestations in mature lodgepole pine and Engelmann spruce stands. During this period, 114 projects were completed at a cost of $3,108,069. The following summary shows survey and control actions undertaken through the special funding.

Summary Special Bark Beetle Funding Nelson Region
1984-1987

Year	Survey (ha) Aerial	Survey (ha) Ground	Road (km)	Access Bridges	Volume Under Attack Harvested (m^3)	Pheromone cont. (ha)	Single Tree Disposal (no.)	Trap Tree (no.)	Cost
1984	1,353,000	8,880	45	4	269,000	976	1,886	859	$760,325
1985	1,270,000	18,100	41	2	1,620,000	570	1,400	100	786,654
1986	1,557,000	22,514	31	1	1,280,000	1,870	9,925	0	662,783
1987	1,677,200	50,433	63	3	1,366,000	1,170	18,538	0	898,307
TOTAL	5,857,200	99,927	180	10	4,535,000	4,586	31,749	959	$3,108,069

- E. Morris, Nelson Forest Region, Nelson.

Timber Harvested as A Result of Forest Pest Damage, Nelson Forest Region. Timber harvested under normal quota in the Nelson Forest Region as a result of forest pest damage during the 1987 calendar year was approximately 25 percent of the annual allowable cut. No non-quota licences were issued to harvest pest damage timber in 1987. The following summary shows volumes harvested by district and tenure:

Timber Harvested m^3 in 1987 as a Result of Forest Pest Damage

Nelson Forest Region

T.S.A.	Pest[1]	TFL	FL	TSL	SBEP	Total
Cranbrook	MPB	0	400,533	0	30,431	430,964
Invermere	MPB	0	298,002	9,375	33,973	341,350
	SB	13,750	1,787	0	0	15,537
	ARD	0	241	187	0	428
Golden	SB	0	5,000	0	0	5,000
	ARD	0	24,448	0	7,835	32,283
Revelstoke	SB	40,637	0	0	0	40,637
	WPBR	2,350	0	0	0	2,350
Arrow	MPB	0	43,733	0	23,000	66,733
	WPBR	35,250	15,005	0	2,350	52,605
Koot. Lake	MPB	0	37,500	0	12,500	50,000
	SB	0	0	0	6,250	6,250
	ARD	0	0	0	25,000	25,000
Boundary	MPB	214,752	193,750	0	68,750	477,252
TOTAL		306,739	1,019,999	9,562	210,089	1,546,389

1 MPB - mountain pine beetle
SB - spruce beetle
ARD - armillaria root disease
WPBR - white pine blister rust

Summary Volumes Harvested m^3

MPB	1,366,299
SB	67,424
ARD	57,711
WPBR	54,955
TOTAL	1,546,389

- E. Morris, Nelson Forest Region, Nelson.

Bark Beetle Funding Process - 1988/89. The funding process for the bark beetle program will change in 1988 in an attempt to align resource allocations with the biology of the insect and management activities. Funds will be allocated to Regions and Districts in two phases.

First phase allocations are intended to provide adequate resources to carry out work that must be done between April and September. This will include bait purchases and placement, aerial photography, ground and aerial surveys, application of MSMA, and others. Overall, the intent is to use first phase funding to more precisely determine priorities to be addressed in the balance of the year. This will ensure that priorities and projects address current problems.

The second phase of the funding will be allocated in late summer/early fall of 1988 and will be based on current information from the summer. Activities covered by this will include further ground truthing, prioritization of harvest, and fall and burn programs.

This funding mechanism is more in line with beetle management needs and should greatly reduce the needs for mid-season reallocations from Region to Region.

- P. Hall, Protection Branch, Victoria.

Prince Rupert Forest Region Mountain Pine Beetle (MPB) Winter Mortality. Overwinter mortality of MPB larvae was estimated by sampling two 20 x 23 cm bark slabs at breast height from at least ten currently attached lodgepole pine per sampling site. Nine sites were sampled from various locations throughout the Lakes, Morice and Bulkley Forest Districts during March by BCFS and contract crews. On average, approximately 25% of the larvae examined had died by late March. "Normal" winters usually produce at least 75% mortality, thus, the unseasonably mild winter in 1987/88 hardly affected the MPB population in this Forest Region.

This is the fourth consecutive year winter mortality data has been compiled in the Prince Rupert Forest Region. However, sampling methods differed greatly from year to year thereby making it difficult to use some of this data to assess whether early spring sampling can be used to predict the severity of beetle damage in the ensuing summer. The survey will be continued and results will be compared with CFS and other BCFS data to determine if March beetle sampling should be continued.

- T. Ebata, Prince Rupert Forest Region, Smithers.

Population Sampling Mountain Pine Beetle. Cariboo has had two mild winters in succession in 1986 and 1987, in contrast with the two extremely cold winters of 1984 and 1985. Larval survival was high in 1986 and no change has been noted in 1987: mortality studies in the Quesnel Forest District indicated survival of about 85%; samples collected from the Horsefly Forest District District indicate a survival rate of greater than 80%; a sample from Lower Lake in the 100 Mile House Forest District had an 89% survival rate; and, most significantly, larval survival in the Chilco Lake area, Chilcotin Forest District, is 95%. This high rate of survival combined with light attack in most areas indicates that maintenance of an aggressive control program is more important than ever.

- D. Doidge, Cariboo Forest Region, Williams Lake.

Mountain Pine Beetle (MPB) - Chilcotin Forest District. The West Chilcotin, where the original Chilcotin infestation started in 1972, is once again a serious concern. Although the once-epidemic populations throughout the Chilcotin plateau have collapsed, aerial surveys during the late summer of 1987 discovered 525 ha of fresh red-topped pine near Chilco Lake: subsequent ground checks near Franklin Arm and Dorothy Lake indicate that at least 350 ha of green attack must be treated in these areas. There are still large areas of susceptible pine in this section of the District, especially along the west and east shores of Chilco Lake and in the Yohetta Valley. It is suspected that new infestations exist in other Coast Mountain valleys. This will be substantiated with early spring detection flights.

- D. Doidge, Cariboo Forest Region, Williams Lake.

Prince George Forest Region Bark Beetle Special Funding. A total of approximately $1,340,000 was spent in the Prince George Forest Region in 1987-1988 on mountain pine aerial and ground detection, semiochemical baiting, MSMA application, monitoring, and single tree disposal. Projects were undertaken in four Forest Districts including Regional activities in monitoring, semiochemical purchases and aerial photography. Expenditures accounted for 94% of the original allocation and all projects were monitored for cost-effectiveness.

Approximately $1,802,000 has been requested under the Bark Beetle Special Funding Program for 1988-89 for 15 projects in 4 Forest Districts of the Prince George Forest Region. All funding will be expended on mountain pine beetle detection, semiochemical baiting, MSMA application, monitoring, and single tree disposal. As in last year's program, all activities will be monitored and audited by Regional staff to ensure cost-effectiveness of expenditures.

- R. Cozens, Prince George Forest Region, Prince George.

1988-89 Bark Beetle Proposals - Nelson. Planned activities included in the 1988 bark beetle project proposals are:

Surveys

Aerial surveys will be conducted on 839 000 ha of infested and susceptible lodgepole pine stands. The surveys will include aerial overviews using fixed wing aircraft to sketch map all bark beetle infestations. These surveys will be followed with more detailed mapping using rotary wing aircraft or aerial colour photography in areas where ground surveys and control actions are planned.

Ground surveys will be done on 55 000 ha of infested and adjacent lodgepole pine stands to determine infestation intensities and boundaries so that areas can be scheduled for priority control/salvage harvesting, pheromone containment and single tree disposal.

Control

Access construction and upgrade of 12 km of road will provide access into infested lodgepole pine stands for harvesting. These roads will be used primarily for the Small Business Enterprise Program (SBEP).

Harvesting of an estimated 3 039 000 m^3 of lodgepole pine volume under attack will be scheduled for priority harvesting over the next three years. This harvesting will be done by the licensees and the SBEP in the approximate proportion of 2 499 000 m^3 Licensees, 540 000 m^3 SBEP.

Pheromone containment will be used on 1 966 ha to contain small mountain pine beetle infestations and will only be used in areas that will be harvested before beetles emerge from the baited areas. These baits will be utilized to contain the 1988 beetle flight.

Single tree disposal (cut/burn, MSMA) will be used to treat spot infestations of mountain pine beetle infestations to slow the spread in areas where harvesting is planned in the near future. An estimated 16,810 trees are included in this phase.

- E. Morris, Nelson Forest Region, Nelson.

Increase Cut for T.F.L. No. 8, Boundary Forest District. The Chief Forester has approved an increase in the "base level" of the AAC of T.F.L. No. 8 from 145 000 m^3 to 275 000 m^3 for the period of January 1, 1987, to December 31, 1990. This emergency increase in the rate of harvest is to permit harvesting and salvage of beetle infested lodgepole pine stands with an estimated volume of 880 000 m^3 currently under attack. Because almost all infested volume occurs in lodgepole pine stands which are mature as defined as having reached culmination of growth in the timber supply analysis, a significant reduction of the allowable cut as a result of the temporary increase is not anticipated. During the calendar year 1987, 214 752 m^3 of lodgepole pine volume under attack by the mountain pine beetle was harvested on T.F.L. No. 8.

- E. Morris, Nelson Forest Region, Nelson.

Large-Scale Use of MSMA Planned for Battling Mountain Pine Beetle (MPB) in the Prince Rupert Forest Region. Pesticide Use Permits have been applied for to treat scattered MPB infestations in the Lakes, Morice and Bulkley Forest Districts after the treatment was successfully demonstrated last summer. Broad areas in each of these Districts have been identified as likely candidates for treatment. The Forest Districts may choose to use MSMA or more conventional means of control such as fall and burn, or brood removal, depending on the size of the infestation observed after the flight.

An estimated 5,000 trees will be treated within a three-week period this summer marking the first large-scale use of MSMA for pine beetle control in this Forest Region. Currently, Forest District and Regional staff are preparing for this summer's treatment by organizing schedules for beetle flight monitoring, certifying staff as pesticide project managers, and obtaining the necessary safety and application equipment. It is possible that future applications may be put to contract which would alleviate the demand for BCFS staff time during the peak of fire season.

- T. Ebata, Prince Rupert Forest Region, Smithers.

Mountain Pine Beetle Populations Rising in Hawkins/Freeman Creek Kootenay Lake Forest District. A ground survey was conducted in the fall of 1987 to check on chronic infestations of mountain pine beetle lodgepole pine in Hawkins/Freeman Creek. Although no new infestations were observed by the aerial overview flight in July 1987, the survey crew's finding indicated a sharp increase in beetle populations.

Of the 2 800 ha surveyed, approximately 3,600 green attacked lodgepole pine were tallied. This represents an increase of ten times the average number of green attacks found annually within that specific area.

The buildup of beetle populations is due to the excessively dry and warm climatic conditions during the last few years. Two distinct beetle flight periods were observed during 1987 (July and September). The July flight produced successful larval broods with little or no winter mortality, while the September flight produced only partially successful larval broods.

Kootenay Lake Forest District is planning to aerially and ground survey extensive areas by air and ground in the Hawkins/Freeman Creek drainages during the 1988 field season.

After priority control areas are determined, direct control methods will be utilized to reduce beetle populations. Methods will include sanitation logging, single load extractions, pheromone baiting, piling and burning and MSMA treatment of infested trees.

- J. Schafthiezen, Kootenay Lake Forest District, Nelson.

Hauling Restrictions for Mountain Pine Beetle Infested Wood. Forest Licencees in the Quesnel Forest District have recently sold some lodgepole pine logs to Prince George area mills. Since some of this timber has been logged from mountain pine beetle infested areas, there was a risk that infested wood could spread mountain pine beetle into relatively uninfested areas of Prince George. Consequently, the hauling of logs from infested cutblocks in the Quesnel Forest District to Prince George will be restricted from June 15th to September 15th. In addition, any logs from infested blocks that are brought to Prince George, must be milled prior to July 1st.

- R. Cozens, Prince George Forest Region, Prince George, and R. Schultz, Quesnel Forest District, Quesnel.

Pheromone Trial. Kamloops Forest Region has received 18.1 kg of "MCH" bead material pheromone lure care of Phero Tech Inc. and will be using this in a trial near Birk Creek in the Kamloops Forest District, or in the Lillooet Forest District. The MCH will be applied (@ 4.4 kg/ha) to individual felled Douglas-fir within a one ha block and to the entire area of another one ha block which contains felled Douglas-fir. This will be replicated twice and assessed on the basis of number of attacks, density of attacks and population successfully developing in treated logs as compared to check areas.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Mountain Pine Beetle Standard Operating Procedures. "Standard Operating Procedures" (S.O.P's) are Regional Manager approved guidelines and methods for conducting forest management activities. Two new S.O.P's have recently been finalized in the Prince George Forest Region for the control of mountain pine beetle. They outline the proper use of semiochemicals and MSMA to manage mountain pine beetle within the Region. Copies have been circulated to all Forest Service Regional offices for possible consideration and incorporation into their own programs. Additional copies are available to Forest Service personnel by contacting the undersigned.

- R. Cozens, and R. Hodgkinson, Prince George Forest Region, Prince George.

Flathead Story. A final draft manuscript has now been provided by Cameron Young which discusses the mountain pine beetle outbreak in the Flathead Valley and the management response. This report is intended to be published as a pest management report this summer.

- P. Hall, Protection Branch, Victoria.

Spruce Beetle Licences Awarded. Forest Licences were recently awarded in the Lillooet T.S.A. to remove spruce beetle infested timber in the McGillivray and Connel Creek drainages, west of Anderson Lake. The spruce beetle has reached epidemic proportions in these drainages and since they are effectively isolated from the Lillooet T.S.A.'s manufacturing facilities, these Forest Licences were advertised.

Don McRae Logging Ltd. of Squamish was awarded 150,000 cubic meters in Connel Creek with three years for removal of dead, infested and susceptible spruce according to an approved management and working plan. Creekside forest Products Ltd. of Pemberton was awarded 75,000 cubic meters in McGillivray Creek with three years for removal.

It is anticipated that logging will commence in 1988 with the majority of the infested volumes removed prior to the 1989 flight. Once access is gained, there will be an active program to salvage all volumes which are infested or at risk and to prevent further spread of the spruce beetle.

- D.W. Donaldson, Lillooet Forest District, Lillooet.

Douglas-fir Beetle Trap Tree Program - Chilcotin Forest District. In the fall of 1987 Douglas-fir beetle populations were noted to have significantly increased in the Alexis Creek area, along the Highway #20 corridor. Low precipitation in the Chilcotin is thought to be responsible for increased attack on stressed trees. Aerial survey and mapping revealed the need for a control program.

A major problem, however, was that many attacked trees were not on Crown land which greatly complicated the administration and coordination of an effective control program.

District staff have implemented the disposal of infested trees and deployed over 50 non-lethal trap tree sites on an area involving four major licensees, Department of Highways, Anahim Indian Reserve, Parks Branch, the Municipality of Alexis Creek and various private lands. This program was done five months prior to the spring flight for a cost of $4,000.00. These efforts are expected to pay large dividends as more infested Douglas-fir have undergone a colour change this spring. With the traps in place and a high level of awareness by the program participants, a much larger problem is being avoided.

During the fall and winter of 1988/89 trap trees will be harvested or disposed of in conjunction with small business logging operators. Ground detection and harvesting of additional infestations will take place during the winter of 1988/89.

- R. Stewart, Cariboo Forest Region, Williams Lake.

Western Pine Beetle Control - Boundary Forest District. In 1987, an endemic presence of western pine beetle, Dendroctonus brevicomis, was noted in ponderosa pine in the valley around Grand Forks. With foliage discoloration becoming more prevalent in the late fall and early winter, it became apparent that the ponderosa pine in the valley was being threatened. The Ministry placed an article in the local newspapers advising residents of the presence of western pine beetle and asked residents to report suspected infested trees to the District office. The response was greater than anticipated. Pest Management hired a crew to check the reported infestations and initiated a felling and burning program in cooperation with local land owners and the City of Grand Forks. The success of the control operations will not be fully known until the fall of 1988.

- B. Zuber, Boundary Forest District, Grand Forks.

Protection Manual. A chapter regarding management of defoliators will be completed this year. The chapter will deal with defoliators in general and specifically with western spruce budworm and Douglas-fir tussock moth.

- P. Hall, Protection Branch, Victoria.

Western Spruce Budworm Strategy. As part of the Kamloops Regional western budworm strategy, Silviculture has developed a matrix of biogeoclimatic zones (divided into moisture regimes) and silvicultural systems and assessed each of the components of this matrix on the criteria of successful regeneration and performance. The history records were then searched for examples in the Region of these systems in given zones. Once all these areas have been identified, the recorded range of the budworm is overlaid on this scheme. All areas which also are within the range of the budworm will be surveyed to assess the subsequent success of each of these systems once the factor "budworm" has been introduced.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Spruce Budworms. Western spruce budworm (Choristoneura occidentalis) has continued to expand, primarily in the Kamloops Forest Region. Cariboo and Nelson Forest Regions are also affected to some extent. The spruce budworm (C. fumiferana) is also widespread in the Ft. Nelson Forest District of the Prince George Forest Region.

Although no plans for widespread treatment of these outbreaks is being considered at this time, trials with B.t. will be done in Kamloops, Nelson, and Prince George Forest Regions. The Kamloops and Nelson programs will continue and expand the program initiated in 1987. The objectives are to evaluate B.t. as a control agent in multi-story stands, provide training to Region and District staff, and to develop damage appraisal information. Additional permanent sample plots will be established in sprayed and check areas to provide impact data.

Limited trials using B.t. will also be conducted in the Ft. Nelson Forest District to evaluate control of budworm on seed trees and as a protective treatment in plantations.

- P. Hall, Protection Branch, Victoria.

Western Spruce Budworm; the saga continues. The 1987 fall egg mass surveys indicate another banner year for the western spruce budworm in the Kamloops Forest Region. The operational spray trials using B.t. have been slightly expanded from 1987. Five new areas have been included in the 1988 spray program. These include White Lake, Salmon Arm District; Crown Bench, Lillooet Forest District; Woodlot No. 300, Clearwater Forest District; T.F.L. 16, Crown Forest Ind. Ltd., Armstrong; and Woodlot No. 414, Rock Creek, Nelson Forest Region for a total of about 2 100 ha., including the 11 original blocks. All new treatment areas were chosen using the same criteria as for the original impact study; spaced or selectively logged areas; moderate or severe defoliation in the interior Douglas-fir zones IDFa, IDFb or IDFj and a multi-age stand. Impact assessment plots were established in each of the new spray blocks and in corresponding check areas.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Western Spruce Budworm Operational Trial - Boundary Forest District. An operational trial using the bacteria Bacillus thuringiensis (B.t.) control a western spruce budworm (WSBW) infestation on Woodlot Licence 414 near Rock Creek in the Boundary Forest District will be conducted in 1988. The approximate area to be treated will be 100 ha (50 ha selective cut and 50 ha undisturbed) Douglas-fir stand, where infestations have been active over the past four years. The purpose of the trial will be to assess the effectiveness of B.t. against WSBW, costs, and for the District and Regional pest management staff to gain experience in conducting an aerial spray operation. The project is being carried out jointly with the Kamloops Forest Region pest management staff.

- E. Morris, Nelson Forest Region, Nelson.

Spruce Budworm Project in the Ft. Nelson Forest District. In the Fort Nelson Forest District in June 1988, aerial applications of Bacillus thuringiensis (B.t.) will be made against spruce budworm, Choristoneura fumiferana, larvae in an attempt to minimize defoliation to white spruce stands. Three 50 hectare blocks will be treated as soon as foliage has flushed and larvae reach 3rd to 4th instar. Mature seed production stands adjacent to 4-6 year old regeneration will be selected for treatment. This will be a co-operative project between Forest Service Branch, Region and District offices. This will be the first trial of an aerial application of B.t. against C. fumiferana in B.C.

- G. Vanderkwaak, Fort Nelson Forest District, Fort Nelson, and R. Cozens and R. Hodgkinson, Prince George Forest Region, Prince George.

Understory Population Dynamics of the Western Spruce Budworm (WSB). The Kamloops Forest District "bug crew" are out to bag a few budworms this spring. A trial has been set up to assess the degree of defoliation to the understory which is attributed to, (1) the overwintering larval population on the understory component, and (2) the larval population falling from the overstory onto the understory. Observations in 1987 indicated that much defoliation occurred in the understory before the overstory was fully flushed and larvae began falling. A 100m baseline was established in natural and selectively logged stands. Along this baseline 15 check trees and 15 treatment trees were

chosen. Mesh enclosures were fitted over the 15 treatment trees. All trees were assessed prior to larval emergence and will be monitored throughout the feeding period to compare the degree of defoliation occurring on the open and enclosed trees, and the larval populations present on each group of trees throughout the season.

- L. Maclauchlan, Kamloops Forest Region, and
  K. Smith, Kamloops Forest District, Kamloops.

Fertilization Trials. Assessment plots (12.62m fixed radius) are being established throughout the Kamloops Forest District in conjunction with the B.t. spray program. These plots are located both outside and within spray block boundaries in the interior Douglas-fir zone, IDFa and IDFb. The other stand criteria for plot location are the same as for our impact assessment studies; moderate to severe defoliation, selectively logged or natural. All plots are paired, with one of the pair receiving sulphur coated urea fertilization (@ 432 kg/ha) and the other receiving no fertilization. Plots will be measured annually for response to fertilizer and budworm.

The Zellaria fertilization trial (Salmon Arm Forest District) in lodgepole pine will have its first assessment done in August.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Douglas-fir Tussock Moth. FIDS surveys have indicated a slight increase in tussock moth population in some areas. The Forest Service will be augmenting the FIDS pheromone survey program this year with the view of assuming responsibility in the near future. Tussock moth is expected to increase to levels of concern in the next few years. The Forest Service is maintaining its stock of the virus for use at that time.

- P. Hall, Protection Branch, Victoria.

Black Army Cutworm. A multi-year FRDA-sponsored program examining the impact of black army cutworm (Actebia fennica) will continue this year. This study, being conducted by T. Maher, is expected to provide needed information on the impact of the cutworm and on calibration of pheromone traps for predictive purposes. Final information will be circulated to Regions and Silviculture, when available.

- P. Hall, Protection Branch, Victoria.

Black Army Cutworm and Backlog Reforestation in the North Thompson Valley. In 1987, the FRDA Extension, Demonstration, Research and Development Subprogram supported a problem analysis to assess the past impacts and future damage potential of black army cutworm in the North Thompson Valley of the Clearwater Forest District.

Analysis of 26 recorded cutworm infestations in the study area revealed four locations of seedling damage. These plantations were all located in the interior cedar hemlock, (ICH), biogeoclimatic zone and had been planted in the second season after burning. Because of natural regeneration, however, only one of these sites fell below the minimum stocking standard. Therefore, the investigation concluded that the actual and potential impacts of this pest on backlog and current reforestation efforts in the North Thompson Valley are low. However, the cost of even a small number of plantation failures is

considered to be high and the project report supplies recommendations for minimizing future losses.

This FRDA report, entitled "The Effects of Black Army Cutworm on Backlog Reforestation Efforts in the North Thompson Valley," is currently being published and will be available later this year.

- N. Stromberg, Kamloops Forest Region, Kamloops.

Black Army Cutworm Control Planned for Invermere and Golden Forest Districts. Based on the low incidence of disease and parasitism in the 1987 larval and pupal populations, and high moth counts in pheromone traps, black army cutworm (BAC) infestations are expected to continue in 1988, in the Ram and Giby 1985 wildfire areas in the Invermere Forest District and in the area of Marl Creek on 1986 prescribe burn areas in the Golden Forest District.

In anticipation of these infestations, continuing pesticide use permits have been applied for to use a pyrethroid insecticide which will be applied by ground application using backpack spray equipment. In the 1986 and 1987 plantations (1 640 ha), spot treatments will be done in areas where high BAC larval populations occur if it becomes apparent that significant damage will occur to the seedlings.

In the 1988 planting areas (831 ha), the planting will be scheduled to plant the uninfested and low larval population sites first, then moving onto the higher larval population sites after larval feeding has finished. If this is not feasible, planting will go ahead as scheduled and then spot treated if necessary.

An operational trial is also planned for the Invermere Forest District using different concentration of the pyrethroid insecticide to determine levels that are most effective in controlling BAC larval populations.

The Nelson Forest Region has written up a Standard Operating Procedure as a guideline for the management and control of BAC on wildfire and prescribed burn sites.

- E. Morris, Nelson Forest Region, Nelson.

Distribution and Intensity of the white Pine Weevil (Pissodes strobi) in the Cariboo Region. Spruce plantations in the Cariboo are reaching the susceptible size (1.5 m - 9.0 m) for weevil attack. A survey has been undertaken to determine the location and intensity of attack in the susceptible plantations. A total of 15 randomly chosen plantations have been sampled using systematic row sampling: 10 plantations in Quesnel, 1 in Williams Lake (the only susceptible plantation), 3 in Horsefly and 1 in 100 Mile House (Chilcotin being omitted as this District has no spruce plantations). At least 12 more plantations in Horsefly and 6 in 100 Mile House have been selected to be cruised. Emphasis was placed on current year's attack, although old attack was noted as well. The results of the 15 plantations are as follows:

DISTRICT	PLANTATION	YEAR PLANTED	TOTAL TREES AFFECTED %	NEW ATTACK %
QUESNEL	McKenna Creek	1976	3.82	1.05
QUESNEL	Bowron	1975	6.74	1.23
QUESNEL	Carters Mtn.	1976	4.24	0.83
QUESNEL	Towkuk Creek	1979	0.30	0.30
QUESNEL	300 Rd:unbrushed	1974	7.39	3.19
QUESNEL	300 Rd:brushed	1970	12.00	5.71
QUESNEL	Cottonwood River	1966	39.43	10.28
QUESNEL	15 Mile Lake	1967	28.80	13.95
QUESNEL	Baker Lake	1967	42.60	19.24
QUESNEL	2 miles East of 15 Mile Lake	1967	39.80	10.96
WILLIAMS LAKE	Forest Lake	1964	0.68	-
HORSEFLY	Mitchell Bay	1968	52.06	15.20
HORSEFLY	Raft Cr. (A)	1968	6.96	3.47
HORSEFLY	Raft Cr. (B)	1968	35.84	5.57
100 MILE	Spanish Lake	1970	2.89	0.32

These results indicate that the weevil is a serious pest in the Cariboo Forest Region and control action will have to be considered.

- K. Lewis, Cariboo Forest Region, Williams Lake.

Gypsy Moth. The 1987 trapping program indicated three areas in B. C. where eradication efforts would be required in 1988. These areas are Colwood, Parksville, and Kelowna. Agriculture Canada has developed treatment proposals for all three areas which incorporate multiple applications of B.t. by aerial and ground methods. Public meetings in each of these areas have led to the acceptance of these proposals and treatment will likely commence in early summer after larval emergence. The B. C. Forest Service will provide assistance to Agriculture Canada and other cooperators, where possible.

The pheromore trapping program will continue in 1988 with the Forest Service maintaining its commitment to place approximately 2,000 traps in forested areas not covered by the Ag. Canada or FIDS trapping programs.

- P. Hall, Protection Branch, Victoria.

FOREST PATHOLOGY

Root Disease Assessment in Coastal Backlog Areas. In 1986 under the Forest Resources Development Agreement 1985-90, Backlog Reforestation Program, Research Development Sub-Program, Project 2.28 "Root Disease Assessment in Coastal Backlog Areas" was established. This summary of progress was presented on February 22, 1988, to the Coastal Technical Advisory Committee.

The project was initiated in response to concerns about laminated root rot in coastal backlog areas, and apparent inadequacy of then-current information and techniques to deal with the disease in backlog areas.

Two approaches have been recommended (Protection Manual Vol. II, Ch. 6 and Vancouver Regional Directives) to prevent or reduce the root disease:

1. Plant or establish a less-susceptible tree species. These include western red cedar, lodgepole pine, and western white pine.

2. On favourable sites, remove stumps and roots with an excavator. This approach is costly (up to $1,000 per ha), and limited to sites and soil conditions that will permit operation of heavy machinery.

Both of these approaches require a site survey for the root disease. Application of these treatments to backlog areas was uncertain because these areas lacked susceptible conifers, and were not surveyed previously for the disease.

In 1986-87 the contractor, Sterling Wood Group Inc., completed a problem analysis, and in 1987-88, developed a site assessment technique for the root disease.

The site assessment technique is flexible, and can be used either pre- or post-harvest on backlog areas. It should supplement and facilitate the pre-harvest silvicultural prescription, and complement other site inspections to develop site treatment prescriptions. It is intended as an operational survey of up to 30 ha per day.

The components of the site assessment technique are:

1. Stratify each backlog area into subunits of low, medium, and high hazard to root rot. Criteria are based on inventory type attributes and readily observable features such as the proportion of susceptible tree species, and time since previous logging.

2. Survey the stand around the perimeter of the backlog area. Infection centers are readily apparent, and their frequency is a good indication of the site condition in the backlog area.

3. Survey the moderate to high hazard subunits on the backlog area, including infested stumps, condition of old stumps, soil moisture regime, and soil texture.

4. Rate and combine the survey results, as outlined on the draft survey forms, to obtain an overall site assessment.

5. Prescribe site treatments per subunit on the backlog area.

For 1988-89, the contractor proposed to hold four workshops, and prepare a training video and other reference materials, to train field staff in the use of the site assessment technique. The project (2.53) was approved for 1888-89, and a work plan was circulated for review.

- J. Muir, Protection Branch, Victoria.

Scleroderris Canker. Recent reports from eastern Canada indicated that scleroderris canker could be a potentially serious disease of western conifers, especially lodgepole pine, Douglas-fir and spruce species. A resolution of support for the development of a Canada-Provincial program to halt the spread of the virulent race of the fungus was passed by the Forest Pest Review Committee of B.C. and the Plant Protection Advisory Council of B.C.

Federal officials have responded positively to the resolution and to recommendations to develop a cooperative program.

A major concern is to prevent introduction of the virulent race to B.C. from infected ornamental or nursery stock from infested areas (Canada and U.S.A.) and to prohibit distribution of any infected stock from B.C. nurseries to plantations. Apparently this means of spread was responsible for widespread and severely damaging outbreaks of the canker disease in Quebec, Ontario, and eastern United States. A continuation of the nursery pest monitoring in B.C. by the Ministry and Canadian Forestry Service is required to prevent the disease becoming a problem here.

- J. Muir, Protection Branch, Victoria.

Pinewood Nematode Update. The pinewood nematode continues to be a serious problem for B. C. forest product exports to Europe (European Economic Community, EEC).

Based on Japanese experience where the nematode and the sawyer beetle are killing thousands of pine trees annually in the warmer region of Japan, and the presence of the nematode in wood chips from North America, the EEC proposed regulations to allow member countries to prohibit wood imports unless they were kiln dried, or to permit entry of round wood or sawn wood free of bark and the insect vector (Monochamus spp), or wood chips that were imported and stored under conditions designed to prevent infestation of nearby forests.

The Federal government is continuing efforts to alleviate these restrictions. The nematode, although present in Canada, does not cause the pine wilt disease, possibly because of the cooler temperatures here, than in Japan. In B.C., it is commonly associated with chips from bark beetle-killed trees. Similarily, the nematode might already be in the EEC - several occurrences are known of similar if not identical species - but be unable to cause the disease.

The EEC countries have agreed to postpone further import restrictions, and possibly drop them, based on the outcome of several research projects initiated in Canada and the EEC. The B.C. forest industry continues to monitor the situation, and the Pinewood Nematode Committee of the B.C. Plant Protection Advisory Council is trying to keep all of the local agencies informed of developments.

- J. Muir, Protection Branch, Victoria.

Colletotrichum Seedling Blight. A disease previously known from only one occurrence on western hemlock seedlings at one nursery in B.C. in 1981, has "re-appeared" as a disease of strawberries.

Workers in the United States recently found that a disease of strawberries previously ascribed to Colletotrichum fragariae was in fact due to three pathogens: C. fragariae, C. gloeosporioides, and C. acutatum. The pathogen previously was known to cause terminal crook disease of radiata pine in New Zealand, and hemlock seedling blight in B.C.

The colletotrichum disease of strawberries is mostly a fruit rot, and it was recently found in commercial strawberry fields in California. Subsequently it was found in 1987 on one strawberry plant in B.C., from an intensive survey of B. C. strawberry fields. Although B.C. strawberry growers import California planting stocks, the risk to B. C. strawberries is very low, based on the unfavorably cooler temperatures here. California growers also take extensive measures to ensure that their planting stocks are free of pests.

Hemlock seedlings were found to be susceptible to the fungus, but the risk of infection of greenhouse seedlings appears extremely low. There is little chance that the fungus could survive outdoors.

It is interesting to note that the nursery in B.C. where the outbreak of the disease occurred in 1981 had imported potentially susceptible ornamentals from New Zealand. Also, there was a large commercial strawberry field adjoining the nursery. However, the source of the seedling infection was not established.

The colletotrichum seedling blight episode illustrates the continuing need for pest surveillance of nursery stock, and for nearby plants that could be potential sources of new pest problems.

- J. Muir, Protection Branch, Victoria.

Site Class Distribution Discrepancies - Nelson Forest Region. The Nelson Regional Research document entitled "Tree Species Site Index by Ecosystem Association" was used to estimate the site class distribution within each TSA in the Nelson Forest Region. These distributions were then compared to site class distributions from their respective inventory. The ecosystem sampling method contains less "non normal" samples and it is, therefore, somewhat "cleaner" than the inventory sampling method which of necessity must sample the forest where the plots fall. Hence the ecosystems method measures capability, whereas inventory measures actuality. The table below indicates that the inventory estimate underestimates good and medium site classes. The figure shown is the percentage of total TSA land base.

TSA	Good Site (% underestimate)	Medium Site	Total Underestimate %
Boundary	61	-	61
Arrow	56	-	56
Cranbrook	19	33	52
Kootenay Lake	43	-	43
Invermere	-	24	24
Golden	18	-	18

The reasons for any given site being rated at a lower value than it should be are:

1) air photo misinterpretation in the inventory process,

2) action of diseases,

3) errors in ecological stratification,

4) wrong species on sites and proportional errors in the type grouping, and

5) gross overstocking.

An integrated pest management inventory survey will be undertaken in the Arrow TSA to assess the reasons for the major site class discrepancies. This survey will follow the proposed inventory process for checking the typing, strata labelling and site class verification. Where a site class discrepancy is located in the field, the reasons for that discrepancy will be examined and records kept.

- D. Norris, Nelson Forest Region, Nelson.

Incidence of Rust in Lodgepole Pine Stands and Its Relationship to Juvenile Spacing. A biology student from the University of Victoria has been hired under the University Co-op Programme to study the interrelationships between rust on lodgepole pine and juvenile spacing operations. Stands previously spaced and stands to be spaced in 1988 will be surveyed to establish: mortality since spacing that is attributable to rust; and rust incidence levels in stands scheduled for spacing in 1988. In the latter, permanent sample plots will be established to monitor disease spread over time. While the primary purpose is to study the impact of rust upon juvenile stands, other pest organisms such as mistletoe, root collar weevils and terminal weevils will be noted and monitored.

- R. Cozens, Prince George Forest Region, Prince George.

Annosus Root Disease Survey in the Kalum Forest District. Nineteen western hemlock/amabilis fir stands juvenile spaced in 1979 to 1983 were examined for the incidence of annosus root disease by Pathocon Consulting. Incidence in all live stumps and in dead stumps greater than 10 cm in diameter was used to evaluate the risk to crop trees. Crop trees showed no visible (above ground) signs of root disease. Fifty-four percent of live stumps examined and 25% of dead stumps examined were infected. Based on the above infection levels, the infection rate in living crop trees was estimated at 3.6% or 32 stems per hectare (spha). Total crop trees averaged 900 spha after spacing. Hence, based on this level of infection in this study, annosus root disease does not appear to be a major problem, and costly control measures are probably not warranted. The study also indicated that spacing in winter months did not appear to reduce annosus incidence, unlike the conclusions of earlier studies by Morrison, Larock and Waters (1985).

- W. Martin, Prince Rupert Forest Region, Smithers.

Mechanical Stump Removal for Phellinus Root Disease Control in the Port Alberni Forest District. Since 1980 we have destumped a total of 204 hectares in eight locations to reduce future volume losses to Phellinus weirii. Due to excessive site disturbance experienced using a D8 crawler tractor equipped with a brush blade on the first project we have since utilized only tracked excavators. To lessen site disturbance, improve machine efficiency, and minimize overall project costs we have adopted the following guidelines:

1. Candidate areas must have a preharvest root disease survey to ensure that a minimum size area is treated.

2. Only relatively flat areas (less than 25% slope) that have deep, well drained, moderately coarse textured soils are considered.

3. Areas where greater than 10% of the stumps exceed 75 cm. D.B.H. are avoided.

4. Openings which have light slash loading or have been broadcast burned are preferred.

5. A medium size tracked excavator (145 kw) equipped with a hydraulic thumb, and complete brush guard kit is preferred.

6. Stumps not to be removed (hardwoods, cedar, pines) are premarked particularly on burned areas.

7. Constant on-site supervision is required.

8. Stumps remaining from previous logging which occurred more than 50 years prior to final harvest need not be removed as ectotrophic mycelium is no longer present.

- A. Cottini, Port Alberni Fort District, Port Alberni.

Root Raking in Salmon Arm. As an update for the raking trial to control Phellinus weirii, the Kamloops Forest Region is happy to report that the Lee Creek site (P.M.P. Nov. 1986, pg.28, Nov. 1987, pg.33) is now planted. Three densities of interior Douglas-fir have been placed en terre and the trial has been fenced to keep our bovine pals at bay.

A video was produced of the root rake in action and the area has hosted several groups curious in the ways of root rot management.

- H. Merler, Kamloops Forest Region, Kamloops.

Spacing in Armillaria root disease - Infected Stands in the Merritt Forest District. Three treatments; control (no spacing), space as normal and space to remove Armillaria infected trees were completed on two replications. Thirty 5.65 meter radius permanent sample plots were established. An initial document has been prepared as per a F.R.D.A. contract by Pathocon Consulting which will be made ready for distribution.

- H. Merler, Kamloops Forest Region, Kamloops.

Stumping in Kamloops Forest District. A Small Business Enterprise Program sale that was root raked (P.M.P. Nov. 1987, pg.33) is in final preparation for planting in the spring of 1989. The site works well as a demonstration, as it is located along the access to one of the areas more popular fishing lakes. Small business has also helped the cause by funding the production of a large sign that explains the presence of the clear-cut.

Kamloops Forest District is also establishing a demonstration forest in yet another popular public recreation area. Root disease was identified by the District's crack pest management team on a small sale within the demonstration forest. A stumping and species trial will be established to display different management options.

- H. Merler, Kamloops Forest Region, Kamloops.

Roadside Foliage Damage - Boundary Forest District. In response to a request to investigate foliage damage along Highway 33 - Rock Creek to Beaverdell, whose suspected cause was Tordon herbicide spray, Nelson Regional Forest Pathologist and Range Management personnel viewed the area with Boundary Forest District R. O. Protection.

The broad damage pattern showed that: 1) almost all damaged trees were exposed directly to the highway or abandoned roadways and the band of affected trees was less than 5 m wide, 2) damage was not consistent on trees within a damaged area, 3) damage on partly affected trees often showed a slow spiral pattern and 4) damage became evident in the latter half of winter and sometimes an affected tree would have only one small sharply defined patch of damaged foliage.

On the tree, symptoms of damage were from the tip of the needle back towards the base and on exposed upper surfaces. The needles did not have any secondary organism and no epinasty was ever evident. Two foliage samples were taken and sent to the Ministry of Environment and Parks, Laboratory in Vancouver.

Tordon, salt damage, and drought were ruled out as causes. Only frost damage associated with cold, adiabatically cooled air and cold air drainage would fit the pattern of damage.

- D. Norris, Nelson Forest Region, Nelson.

FOREST VEGETATION MANAGEMENT

Technical Advisor, Forest Vegetation Management Research. My name is Phil Comeau, and I have recently started work for the Research Branch as Technical Advisor, Forest Vegetation Management Research. My role will be to provide technical assistance and guidance for vegetation management research in B.C. During the next year, I will be visiting several forest Regions to review current vegetation management research activities and will be evaluating research needs and opportunities. This review will contribute to the development of a strategy for vegetation management research in B.C.

My research interests are in the development of competition and succession models and their application in assessing or predicting competition problems. I will be continuing a research project (FRDA 3.48) initiated in the Nelson Forest Region in 1987, which is examining the effects of competition from thimbleberry and fireweed on light regimes and seedling growth.

- P. Comeau, Research Branch, Victoria.

FRDA Research Projects on Vegetation Management in the Southern Interior. Several research projects aimed at improving the effectiveness of vegetation management practices in the southern interior are being supported by the FRDA Extension, Demonstration, Research and Development Subprogram. The objectives of this initiative are to advance the assessment, prediction, and treatment of vegetation competition, and the assessment of treatment side effects on forest nutrition, downstream water quality and wildlife habitat.

- N. Stromberg, Kamloops Forest Region, Kamloops.

FRDA Research Project in the Southern Interior Assessing Vegetation Management Strageties. The following lists projects by number for vegetation management in the southern interior of the Province. These projects are being directed by the Southern Interior Technical Committee of FRDA.

- Project 3.31 Title: The effects of shrubs and herbs on conifer regeneration and microclimate in a rhododendum - vaccinium - menziesia brush community of south central B.C. This project involves a study of the effects of a range of manual and mechanical site preparation techniques on brush development, seedling microclimate, and performance of planted lodgepole pine and Engelmann spruce seedlings.

- Project 3.31 Title : Vegetation competition and Englemann spruce performance in NSR backlog in the Englemann spruce sualpine fir zone (ESSFm). This project involves an investigation of the patterns of plant community development and identifying the circumstances leading to vegetation competition problems.

- Project 3.40 Title: Mechanical and chemical site treatment effects on plantation success in the Salmon Arm Forest District ESSF zone. This project involves studing and comparing the effectiveness of mechanical scalping, manual patch scarification, and glyphosate herbicide treatments in ameliorating some of the conditions believed to contribute to plantation failure. The conditions may include strong vegetation competition, low soil temperatures and poor nutrient conditions.

- Project 3.41-1 Title: Vegetation management screening trials for the southern interior. This project involves an evaluation of the effects of an array of chemical and non-chemical treatments on vegetation succession, crop trees and crop tree environments in various backlog vegetation communities demonstrating the minimum effective concentrations of those herbicides found to be useful and the phenological period when target species are most susceptible to treatment.

- Project 3.41-2 Title: Developing a plan for southern interior vegetation management research. This project will develop an overall, long-term strategy for research on vegetation management considering all aspects of vegetation management research, including successional studies, cost-benefit analyses, technology transfer and implementation of results. Preparation of an annotated bibliography covering the biology and treatment responses of fireweed, paper birch, Sitka alder, white-flowered rhododendron, thimbleberry and pinegrass will be undertaken.

- Project 3.48 Title: Characterizing light microenvironments for seedlings under vegetation canopies. This project involves determining light competition thresholds for conifer seedlings growing in thimbleberry and fireweed brush communities in the interior cedar hemlock (ICH) zone. In particular, a definition of the relationships between leaf area and attenuation of light through the canopy; relating light regimes under brush canopies to the potential growth; survival of seedlings; and the testing of various methods for operational assessment light competition will be studied.

- Project 3.49 Title: Competition between a Sitka alder dominated brush community and lodgepole pine seedlings in the Montane Spruce zone. This project involves studying lodgepole pine performance at various levels of competition with Sitka alder and associated shrubs and herbs. The critical level of vegetation competition at which pine growth and survival are significantly improved will be determined.

- Project 3.59 Title: Comparison of biological controls with other vegetation control methods in the Nelson Forest Region. This project will compare the relative effectiveness of available biological control methods for treatment of thimbleberry and associated hardwood species, and determine if these agents are viable control options, either by themselves or in conjunction with other methods.

- Project 3.60 Title: Controlling aspen regeneration in cutovers by the use of girdling and chemical treatments before harvest. This project compares the biological effectiveness of chemical and mechanical treatments for controlling aspen regeneration in cutovers. The best time to apply such treatments with reference to the potential effects of such treatments on soil fertility, water quality and wildlife habitat will be studied.

- Project 3.63: Assessing the effects of fireweed and associated vegetation on planted conifer survival and growth in the southern interior. This project involves improving techniques for assessing and predicting competitive interactions between fireweed and planted confer seedlings.

- C. Beales, Kamloops Forest Region, Kamloops.

FRDA Extension, Demonstration, Research and Development (shareable) Sub-Program. During the 1987-88 fiscal year, two studies were initiated in the northern interior under FRDA to investigate effects that vegetation control with herbicides might have on wildlife. Th first study, under the direction of John Pollack, Research Silviculturist in the Prince Rupert Forest Region, is assessing the impacts of glyphosate applications in the Sub-boreal Spruce (SBS) Zone on forage for moose (especially willows). In the second study, Dr. Tom Sullivan of the Applied Mammal Research Institute is investigating the effects of glyphosate on small mammal habitat, population levels, and species diversity in wetter subzones of the Spruce, Subalpine Fir (SBS) Zone. Both studies will be continued until early 1990.

In 1988-89, a new study of glyphosate impacts on foods of coastal grizzly bears will begin. Tony Hamilton of the Ministry of Environment and Parks in Victoria will lead this project, which will involve detailed sampling of forage plant vigour and berry production at two research sites in the Skeena and Kilbella River Valleys, and more extensive sampling of operational herbicide applications in the Phillips and Kingcome River areas. This study will also continue until 1990.

- B. Nyberg, Research Branch, Victoria.

RANGE PEST MANAGEMENT

Cariboo Forest Region Noxious Weed Program. In 1987, the Range Section employed two spray crews for the treatment of noxious weeds. A total of 170 acres were treated, using 68 kg of picloram herbicide.

Most of the spraying activity centered in the Clinton area where spotted and diffuse knapweed has become firmly established. In this area the hydro power line running parallel to Highway 97 from Clinton to the Loon Lake turnoff, the Loon Road; the hydro substation on Kelly Lake Road and 20 Mile were the main sites of infestation and subsequent treatment. Dalmation toadflax and blueweed are also problem weeds in this area and a small infestation of the latter was treated.

Nodding thistle sites were treated in the Hanceville and Alexis Creek area. Scentless chamomille is now well established in the Alexis Creek area with a large infestation running the length of Million Dollar Hill on both sides. This site is approximately 10 km. long. Scentless chamomille sites are also in the 100 Mile area, as well as Miocene and Horsefly (Tatla Lake - Pinto Lake).

Burdock and houndstongue are showing small to medium infestations in the Gang Ranch and Empire Valley areas; and an infestation of spotted and diffuse knapweed is occurring at Wycott Flats, Gang Ranch.

In the Williams Lake area, knapweed, Canada thistle and bull thistle were treated. Canada thistle has become a concern in the Miocene and Horsefly areas and extensive roadside spraying in these areas has occurred.

The areas of 100 Mile House and Quesnel were treated for knapweed and Canada thistle.

Leafy spurge has become a main concern with large infestations at the Deer Creek Ranch, Alexis Creek and Kosters at Canoe Creek. There is also a small infestation on the roadside towards Empire Valley.

- L. Armstrong, Cariboo Forest Region, Williams Lake.

PESTICIDES

Pesticide Use in B.C. Forestry, 1987. A new report has been published and is available from Protection Branch (Please refer to the Publications and Reports Section). Treatments to forest lands by the B.C. Forest Service and forest companies covered, approximately, 42 948 hectares (ha) in 1987. The BCFS was responsible for 15 851 ha and forest industry for 27 097 ha. Most of the applications (86%) occurred in the Prince George, Vancouver and Kamloops Forest Regions with, respectively 16 465, 14 092 and 6 408 ha treated.

Glyphosate (Vision) herbicide was applied to 36 671 ha, an increase of approximately 16 000 ha, from 20 706 ha in 1986.

Site preparation and conifer release projects were conducted at approximately the same levels as in 1986. However, brushing projects to enhance crop seedling survival, increased by approximately 14 000 ha.

Helicopters and fixed wing aircraft were used to spray approximately 17 000 ha in 1987, as compared to 7 000 ha in 1986.

- P. Humphreys, Protection Branch, Victoria.

B.C. Forestry Pesticide Use for 1988. Approximately 43 667 hectares (ha) of forest land will be treated with pesticides in 1988.

The heaviest use will occur in the Prince George Forest Region with approximately, 18 900 ha scheduled to receive herbicide treatments. Vancouver, Kamloops and Prince Rupert Forest Regions, will receive herbicide treatments on, respecitively 8 400 ha, 6 300 ha and 5 050 ha. Nelson and Cariboo, together, will receive herbicide treatments on approximately 3 350 ha. In addiition, the Kamloops Forest Region will treat approximately 1 164 ha with insecticides in 1988, involving mostly Bacillus thunngiensis for western spruce budworm control.

Summaries of proposed pesticide use in 1988 by forest industry and the B.C. Forest Service were compiled by G. Ackerman, Silviculture Branch and P. Humphreys, Protection Branch. Please refer to Tabulation and Graphics Section.

- G. Ackerman, Silviculture Branch; and
  P. Humphreys, Protection Branch, Victoria.

FISC Becomes PUAC. The Forestry Issues Steering Committee (FISC, see PMP VI (2): 53-54) is now the Pesticide Use Advisory Committee (PUAC). A new fact sheet on the objectives and projects sponsored or endorsed by PUAC is in preparation. Basically, the purpose of this group remains unchanged - "to assist and advise Ministry Executive and Ministry staff in dealing with the management issue of pesticide use on forest and range lands."

- R. F. DeBoo, Protection Branch, Victoria.

Ombudsman's Report on Pesticide Regulation. The provincial Ombudsman has just published a report of his investigation into the pesticide use permit system in B.C. The report entitled Pesticide Regulation in British Columbia, Public Report #11, March, 1988, offers recommendations to both the Pesticide Control Branch and the B.C. Environmental Appeal Board. The recommendations are aimed at enhancing the openess of the permit review system to the public and to ensuring natural justice to appellants. The Ombudsman in the report sites the B.C. Forest Service as an example for other pesticide users to follow in the careful use of pesticides.

Copies of the report are available from the office of the Ombudsman in Victoria.

- J. Henigman, Protection Branch, Victoria.

B. C. Wildlife Federation Pesticide Policy. At a recent annual convention of the B.C. Wildlife Federation, April 20-23, a new pesticide policy was adopted by the membership. The policy reads as follows:

> Hazardous Chemicals Policy:
>
> The B.C.W.F. supports the judicious use of biodegradable chemical to control pests and nuisance plants on a site-specific basis, providing such chemicals are deployed with knowledge, skill and restraint to avoid unnecessary and inadvertent contamination of waterways, fish, wildlife, plant life and humans.
>
> The B.C.W.F. strongly promotes the use of safe and proven biological methods for the control of unwanted insects and other pest species.
>
> The B.C.W.F. strongly advocates the building of safe disposal sites to eliminate hazardous chemicals already in use in the Province.

Representations by the B.C. Forest Service were successful in convincing the Federation to delete references in their policy, prior to its adoption, to advocate the elimination of aerial spraying.

- J. Henigman, Protection Branch, Victoria.

Pesticide Use Policy Amended. Amended Ministry policy on the regulation of pesticides is complete and accepted by the Ministry Executive. The rewritten policy is very similar to its predecessor with a few important differences. In the policy statement, is a new clause which states:

> The public shall be provided with information on pest problems and potential use of pesticides. Input from the public on alternative pest management strategies shall be welcomed.

Various procedures are identified to ensure that this new policy statement can be achieved. Our pesticide policy is very similar in intent to the recommendations recently made by the Provincial Ombudsman on the pesticide use permit system.

- J. Henigman, Protection Branch, Victoria.

The Pesticide Manual Chapter. Just when you thought that everything had been written about pesticides, yet another document will soon be on your desk. The Protection Manual, Pest Management, Chapter 14, Pesticides, is now being printed. You may be pleased to know that it is not another treatise on how to use pesticides, rather it is a guide for Ministry staff on what existing pesticide references to use. Specific standards are referred to in the Chapter which should vastly reduce the confusion as to which handbook, or which directive should be consulted in the use of pesticides. We hope it makes life simpler.

- J. Henigman, Protection Branch, Victoria.

Handbook for Pesticide Applicators and Dispensers: Forestry Supplement. This supplement has been used for 3.5 years in the Forest Pesticide Applicator courses and is due to updating in July, 1988. Individuals with additions or revisions should send them to the Stuart Taylor, Ministry of Forests and Lands, Protection Branch, 2nd Floor, 31 Bastion Square, Victoria, B.C. V8W 3E7, 387-8743, prior to July 17, 1988.

- S. P. Taylor, Protection Branch, Victoria.

Forest Pesticides Handbook of B.C. Amendments. Amendments to the text of the seven volume Forest Pesticide Handbook of B.C. have been completed by the Ministry and are currently going through a final edit and printing by the Council of Forest Industries of B.C. Within a few months, the amendment package will be sent to the owners of the Handbook. In the amendment package is information on new pesticides, elimination of old pesticide information, new techniques, labels and legislation.

- J. Henigman, Protection Branch, Victoria.

Droplet Spectrums From Western Spruce Budworm Treatments. In the spring of 1987 aerial insecticide treatments covering 890 hectares were conducted in the Kamloops Forest Region. Petri dishes, Kromokote and water sensitive deposit cards were compared as collection devices for small droplets. Samples were shipped to the Saskatchewan Research Council for an accurate determination of droplet size and density.

Results indicated that flat collection surfaces do not provide good receptors for small droplets and there was no correlation between droplet density and treatment efficacy. However, an accurate determination of droplet size was possible.

Water sensitive cards failed to pick up the small droplets and colored too easily, due to the high relative humidities at treatment time. Petri dishes were inexpensive to analyze and yielded a B.t. recovery rate of 39%. This rate compares favorably with treatments in Washington and Oregon. Therefore, the search for satisfactory collection devices must continue, preferably needle size and three dimensional.

- S. Taylor, Protection Branch, Victoria.

MSMA Efficacy Evaluation. Three Forest Districts, Vernon, Lillooet and Penticton, will be conducting a study to evaluate the success-rate/effectiveness of MSMA (monosodium methane arsenate) in post-attack treatments against mountain pine beetle. The study will also further refine application techniques and timing of MSMA-treatment. Results and procedures of the study will be reported in the winter edition of PMP.

- L. Maclauchlan, Kamloops Forest Region, Kamloops.

Training for use of MSMA against Mountain Pine Beetle in Prince George Region. A series of training sessions on the use of MSMA (monosodium methane arsenate) against mountain pine beetle will be undertaken in early May in Districts of the Prince George Forest Region. The training session will consist of a one-hour classroom presentation followed by a short field demonstration and practice session. Training will be available to Forest Service and B.C. Parks employees, licencees and contractors within districts having infestations of mountain pine beetle.

- R. Hodgkinson, Prince George Forest Region, Prince George.

Pre-attack Injection of MSMA against Mountain Pine Beetle. A biology student from Simon Fraser University has been hired under the University Co-op Program to conduct a trial of MSMA against mountain pine beetle in the Prince George Forest Region. Standing lodgepole pine will be baited with semiochemicals and injected with various dosages of MSMA at various intervals prior to the expected mountain pine beetle flight. Results will reveal if a pre-attack injection of MSMA at a certain dosage is effective in killing mountain pine beetle in semiochemical-baited lodgepole pine.

- R. Hodgkinson, Prince George Forest Region, Prince George.

PEST MANAGEMENT PERSONNEL
(Forest Service Personnel fully or partly committed to forest pest management activities

Protection Branch

R.F. (Bob) DeBoo	Manager, Pest Management	Victoria	387-8740
P.M. (Peter) Hall	Forest Entomologist	Victoria	387-8742
J.F. (John) Henigman	Pesticide Specialist	Victoria	387-8738
J.A. (John) Muir	Forest Pathologist	Victoria	387-8739
S.P. (Stuart) Taylor	Pest Management Technician	Victoria	387-8743
P.J. (Pat) Humphreys	Pest Management Technician	Victoria	387-8737

Silviculture Branch

M. (Mike) Wyeth	Silviculturist	Victoria	387-8922
J. (Jacob) Boateng	Brushing and Weeding Specialist	Victoria	387-8905
G. (Gord) Ackerman	Technician-Stand Tending	Victoria	387-8912
D. (Don) Summers	Seed Production Pest Management Officer	Victoria	387-3931
B. (Bev) McEntire	Seed Production Pest Management Technician	Victoria	387-8938
G.M. (Gwen) Shrimpton	Nursery Pest Management Officer	Surrey Nursery	576-9161

Cariboo Forest Region

Region Staff

D.F. (Don) Doidge	Pest Management Coordinator	Williams Lk.	398-4442
(vacant)	Forest Entomologist	Williams Lk.	
J. (Jane) Perry	Stand Tending Forester	Williams Lk.	398-4400
(vacant)	Forest Pathologist	Williams Lk.	
C. (Chris) Easthope	Range Agrologist	Williams Lk.	398-4396

District Staff

R. (Richard) McKay	Resource Officer - Protection	Chilcotin	394-4215
D.R. (Derek) Poole	District Pest Management Coord.	Horsefly	620-3417
D. (Dennis) Asher	Resource Officer - Protection	Quesnel	992-4400
A. (Alex) Wallach	District Pest Management Coord.	Williams Lk.	398-4341
R. (Robin) Fennel	District Pest Management Coord.	100 Mile House	395-2522

Kamloops Forest Region

Region Staff

L. (Lorraine) MacLauchlin	Forest Entomologist	Kamloops	828-4177
H. (Hadrian) Merler	Forest Pathologist	Kamloops	828-4176
R. (Ron) Gray	Stand Tending Forester	Kamloops	828-4163
R. (Rick) Tucker	Range Agrologist	Kamloops	828-4582

Kamloops Region (District Staff) cont'd.

District Staff			
J. (Jim) Jones	Resource Officer - Protection	Clearwater	674-2265
K. (Ken) Smith	Pest Management Technician	Kamloops	372-5832
J. (John) Flannigan	Pest Management Technician	Lillooet	256-7531
T. (Tom) Lacey	Resource Officer - Protection	Merritt	378-9311
H. (Harry) Spahan	Pest Management Technician	Merritt	378-9311
J. (Jim) Mottishaw	Pest Management Technician	Penticton	492-8721
D. (Dave) Proctor	Resource Officer - Protection	Salmon Arm	832-7153
E. (Eric) Haupt	Pest Management Technician	Vernon	542-0264

Nelson Forest Region

Region Staff			
E. (Ernie) Morris	Pest Management Specialist	Nelson	354-6144
D. (Don) Norris	Forest Pathologist	Nelson	354-6143

District Staff			
D. (Dan) Reiben	Pest Management Officer	Arrow	365-2131
B. (Ben) Zuber	Pest Management Officer	Boundary	442-5411
S. (Steve) Byford	Pest Management Officer	Cranbrook	426-3391
L. (Larry) Hewlett	Resource Officer - Protection	Golden	344-7500
E. (Emile) Begin	Pest Management Officer	Invermere	342-4200
J. (Jim) Schafthiezen	Pest Management Officer	Kootenay Lk.	825-4415
A. (Archie) McConnachie	Resource Officer - Protection	Revelstoke	837-7611

Prince George Forest Region

Region Staff			
R.D. (Russ) Cozens	Pest Management Forester	Pr. George	565-6119
R.S. (Bob) Hodgkinson	Forest Entomologist	Pr. George	565-6122
G.B. (Bruce) Pamplin	Stand Tending Forester	Pr. George	565-6179
(vacant)	Forest Pathologist	Pr. George	

District Staff			
P. (Paul) Gevatkoff	Resource Officer - Protection	Dawson Cr.	784-2350
R.E. (Roy) Simpson	Resource Officer - Protection	Ft. Nelson	774-3936
G.H. (Gerry) Vanderkwaak	Resource Assistant - Protection	Ft. Nelson	774-3936
J.A. (John) Reid	Resource Officer - Protection	Ft. St. James	996-7131
A.R. (Al) Kneeland	Resource Officer - Protection	Mackenzie	997-3310
J.B. (Brian) Kempf	Resource Assistant - Protection	Mackenzie	997-3310
R.G. (Roger) Wiltsie	Resource Officer-Protection	McBride	569-2265
A.D. (Dale) Cinnamon	Resource Assistant - Protection	McBride	569-2265
L.M. (Larry) Johnson	Resource Assistant - Protection	Pr. George East	562-4121
F.L. (Fred) Turner	Resource Officer - Protection	Pr. George West	564-6634
B.L. (Bruce) Doerksen	Resource Assistant - Protection	Pr. George West	565-6281
M.F. (Mike) Dittaro	Acting Resource Officer - Prot.	Vanderhoof	567-9281
M.B. (Mike) Pritchard	Resource Assistant - Prot.	Vanderhoof	567-9281

Prince Rupert Forest Region

Region Staff

M. (Mike) Geisler	Acting Protection Officer	Smithers	847-7477
T. (Tim) Ebata	Forest Entomologist	Smithers	847-7479
W. (Wayne) Martin	Forest Pathologist	Smithers	847-7478
F. (Fred) Newhouse	Stand Tending Forester	Smithers	847-7514
D. (Don) Russell	Range Officer	Smithers	847-7443

District Staff

W. (Bill) Jensen	Resource Officer - Protection	Bulkley	847-7555
K. (Ken) Bush	Resource Assistant - Protection	Bulkley	847-7555 or 847-7629
S. (Sam) Campese	Resource Officer - Protection	Cassiar	771-4211
J. (Joe) Katasonoff	Resource Officer - Protection	Kalum	638-3302
K. (Kas) Kopec	Resource Assistant - Protection	Kalum	638-3290
B. (Brian) Atherton	Acting Resource Officer - Prot.	Kispiox	842-6581
W.F. (Bill) Davidson	Resource Officer - Protection	Lakes	692-2223
R. (Robert) Krause	Protection Resource Technician	Lakes	692-2268
B. (Bruce) Hutchinson	Resource Officer - Protection	Morice	845-6288
D. (Dave) Nakashoji	Resource Assistant - Protection	Morice	845-7712
W.T.S. (Bill) Jackson	Resource Officer - Protection	North Coast	627-0457
C. (Craig) Salter	Resource Assistant - Protection	North Coast	627-0472

Vancouver Forest Region

Region Staff

D.G. (Don) Heppner	Specialist-Forest Entomologist	Burnaby	660-7653
J.D. (Jeff) Beale	Specialist-Forest Pathology	Burnaby	660-7654
M. (Mel) Scott	Stand Tending Forester	Burnaby	660-7579

District Staff

T. (Terry) Preston	Resource Officer - Protection	Campbell River	286-3282
R. (Rob) Uttaro	Resource Assistant - Protection	Campbell River	286-3282
D. (Dave) Hames	Resource Officer - Protection	Chilliwack	794-3361
R. (Richard) Saunders	Resource Assistant - Protection	Chilliwack	794-3361
K. (Kerry) Grozier	Resource Officer - Protection	Duncan	746-5123
P. (Pat) Hayes	Resource Assistant - Protection	Duncan	746-5123
D. (Doug) Eastman	Operations Manager - Harvesting	Maple Ridge	465-7161
D. (Denis) Tippie	Resource Officer - Protection	Mid-Coast	982-2621
D. (Dan) Powell	Resource Officer - Protection	Port Alberni	724-9205
A. (Al) Cottoni	Resource Assistant - Protection	Port Alberni	724-9205
C. (Clarence) Friesen	Resource Officer - Protection	Port McNeill	956-4416
C. (Cam) Brady	Resource Assistant - Protection	Port McNeill	956-4416
B. (Barry) Miller	Resource Officer - Protection	Powell River	485-9831
R. (Ron) Diprose	Resource Assistant - Protection	Powell River	485-9831
B. (Brian) Simpson	Resource Officer - Protection	Queen Charlotte Island	559-8447
G. (Greg) Hemphill	Resource Officer - Protection	Sechelt	885-5174
K. (Keith) Davis	Resource Officer - Protection	Squamish	898-9671

MEETINGS

Pest Damage Appraisal Advisory Committee (P.D.A.A.C). On March 15th, this committee held a meeting in Victoria to discuss a variety of damage appraisal concerns. Discussions were summarized and two subcommittees were established as follows:

1. Priority Establishment Subcommittee

   - will prepare a report for P.D.A.A.C. by May 15th, which ranks about 20 pests (provincially) on the basis of damage appraisal needs.

2. Growth and Yield Subcommittee

   - will review forest, stand and tree models available for damage appraisal of forest pests;

   - will estimate with the Inventory Branch the funds and manpower required to calibrate the Prognosis model for the western spruce budworm and laminated root rot/armillaria root disease;

   - will review the mechanisms available for extracting permanent sample plots (PSP) with pest data from the general permanent sample plot data base; and

   - will prepare a report with recommendations to P.D.A.A.C. by May 15th.

- S. P. Taylor, Protection Branch, Victoria and D. Hutcheson, Kamloops Forest Region, Kamloops.

Sunshine Cost Pest Management Seminar and Workshop. The first day-long session was held at Powell River on March 7 for forestry personnel along the Sunshine Coast. Russ Hughes and Jeff Beale of Vancouver Regional Office and Chris Hayhurst of Port Alberni Forest District Office provided valuable accounts of procedures and their experiences in pest management. Response from the audience, which included private sector foresters, technicians, District Managers, and a consultant, suggested that the session was worthwhile and of interest to them. Several good recommendations were received to improve and fine-tune our presentations.

A second, improved, seminar and workshop will be presented within the Vancouver Forest Region in the near future. Please contact the undersigned for additional information and for details concerning your particular interests or needs.

- R. F. DeBoo, Protection Branch, Victoria.

ACAFA Symposium on the Use of Aircraft. A major international symposium will be held at Winnipeg in 1989 to determine the research and development priorities for forestry and agricultural application. Aerial distribution (pesticides, seeds, fertilizer), use in fire management, and aerial photography/remote sensing will be featured. Special presentations will be from manufacturers and users of aircraft, as well as associated organizations and industries.

At this time, the organizing group of the National Research Council's Associate Committee on Agricultural and Forestry Aviation - ACAFA, is planning a three day event with concurrent sessions, field and airport demonstrations (of needs), and perhaps an attached trade-fair.

Readers with particular interests in broadening or improving utilization of aircraft in forestry are invited to provide comments, suggestions and advice to Barry Marsden of Conair Aviation (Abbotsford, Tel. 853-1171) or to the undersigned as we are B. C. members of the Committee.

- R. F. DeBoo, Protection Branch, Victoria.

Symposium on the Management of Lodgepole Pine to Minimize Losses to Mountain Pine Beetle. This symposium will be held July 12 to 14 in Kalispell, Montana. It is being sponsored by the Canada/U.S. Mountain Pine Beetle Program and is a follow-up to the symposium held in Smithers in 1985. The emphasis of the program is on management of pine. The expected audience will include forest managers from national, state, and private lands. Research results from the hazard rating study will likely be presented.

- P. Hall, Protection Branch, Victoria.

Mountain Pine Beetle Field Trip - Canadian Forestry Service/B.C. Forest Service. During the week of February 15, 1988, staff of the B.C. Forest Service and Canadian Forestry Service conducted a tour of mountain pine beetle infested areas within the Ft. St. James and McBride Forest Districts. Dr. Les Safranyik and Rod Turnquist of the Pacific Forestry Centre in Victoria joined Prince George Regional and District staff in inspecting mountain pine beetle infestations and associated logging operations and single-tree disposal programs. Sites inspected included locations within TFL 42 near Ft. St. James and Mt. Robson Provincial Park near Valemount. Inter-agency co-operation is an important component of effective pest management in B.C.

- R. Hodgkinson, Prince George Forest Region, Prince George;
  J. Reid, Ft. St. James Forest District, Ft. St. James, and;
  R. Wiltsie and D. Cinnamon, McBride Forest District, McBride.

Bark Beetle Semiochemical Meeting. The U.S.D.A. Forest Service held a meeting in Denver, during the week of January 26, to discuss and develop a strategy for use of these tools. Presentations were made by J. Borden (SFU), Phero Tech, and by the B.C. Forest Service. The intent of the meeting was to develop a consistent, state-wide approach to the use and further development of attractants and repellants. Summaries of this meeting have been circulated to B.C. Forest Service Regions.

- P. Hall, Protection Branch, Victoria.

Eighteenth International Congress of Entomology. This large event will be held at the U.B.C. campus from July 3 to 9. It will likely be attended by entomologists from government, universities and other agencies from all continents. Several sections of the agenda deal specifically with forest insect topics such as control of scolytids, integrated management of defoliators, use of B t., and regeneration pests. The conference offers an opportunity to see how other jurisdictions are dealing with similar problems.

- P. Hall, Protection Branch, Victoria.

Western Forest Insect Work Conference. The 1988 meeting was held in Flagstaff, Arizona, during the first week of March. It was attended by approximately 150 forest entomologists representing a variety of Canadian and American agencies and universities. Topics discussed at the conference included information systems, incorporating pest data into forest planning process, pests of young stands, pest management in non-timber producing areas, and others. A summary has been circulated to Regional staff.

The 1989 meeting is a proposed joint session with the Forest Pathologist Work Conference and will likely be held in Bend, Oregon, in the latter part of the summer of 1989.

- P. Hall, Protection Branch, Victoria.

TABULATIONS AND GRAPHICS

SUMMARY OF PROPOSED PESTICIDE USE (1988)[1]

BCFS AND FOREST INDUSTRY

Table 1: Area (ha) Scheduled for Treatment by Purpose

FOREST REGION	BRUSH CONTROL	INSECT CONTROL	RANGE WEED CONTROL	TOTAL
Cariboo	2 300	-	33	2 333
Kamloops	6 300	1 164	-	7 464
Nelson	1 050	178	106	1 334
Prince George	18 900	4	130	19 034
Prince Rupert	5 050	22	-	5 072
Vancouver	8 400	30	-	8 430
Total	42 000	1 398	269	43 667
%	96	3	1	100

TABLE 2: Area (ha) to be Treated by Pesticide[1]

COMMON NAME	PESTICIDE	TRADE NAME	CATEGORY*	AREA (ha)	% OF TOTAL
Bacillus thuringiensis		Futura	I	1 163	2.6
permethrim		Ambush	I	101	0.2
asulam		Asulox	H	400	0.9
glyphosate		Vision	H	38 716	88.6
hexazinone		Velpar	H	1 700	3.9
M.S.M.A.		Glowon	I	114	0.3
picloram		Tordon	H	203	0.5
2,4-D		Forestamine	H	1 250	2.9
Others		Various	I, F, R	20	0.04

*I - Insecticide; H - Herbicide; F - Fungicide; R - Rodenticide.

[1] Tables 1 and 2 represent all forestry pesticide use - i.e. herbicides, insecticides, fungicides, etc.

- Prepared by G. Ackerman, Silviculture Branch, and P. Humphreys, Protection Branch.

SUMMARY OF PROPOSED HERBICIDE USE (1988)

BCFS AND FOREST INDUSTRY

TABLE 3: Area (ha) Scheduled for Brush Control Treatment by Method

FOREST REGION	Aerial Spray			Ground Application			Injection			Total		
	BCFS	FI[1]	Total	BCFS	FI	Total	BCFS	FI	Total	BCFS	FI	Total
Cariboo	500	300	800	650	600	1 250	150	100	250	1 300	1 000	2 300
Kamloops	550	250	800	2 250	750	3 000	1 500	1 000	2 500	4 300	2 000	6 300
Nelson	350	100	450	300	100	400	50	150	200	700	350	1 050
P. George	4 600	3 800	8 400	950	950	1 900	2 150	6 450	8 600	7 700	11 200	18 900
P. Rupert	1 300	1 200	2 500	350	650	1 000	550	1 000	1 550	2 200	2 850	5 050
Vanc.	4 000	2 250	6 250	1 200	500	1 700	250	200	450	5 450	2 950	8 400
Total	11 300	7 900	19 200	5 700	3 550	9 250	4 650	8 900	13 550	21 650	20 350	42 000
%			(46)			(22)			(32)	(52)	(48)	(100)

[1]FI - Forest Industry

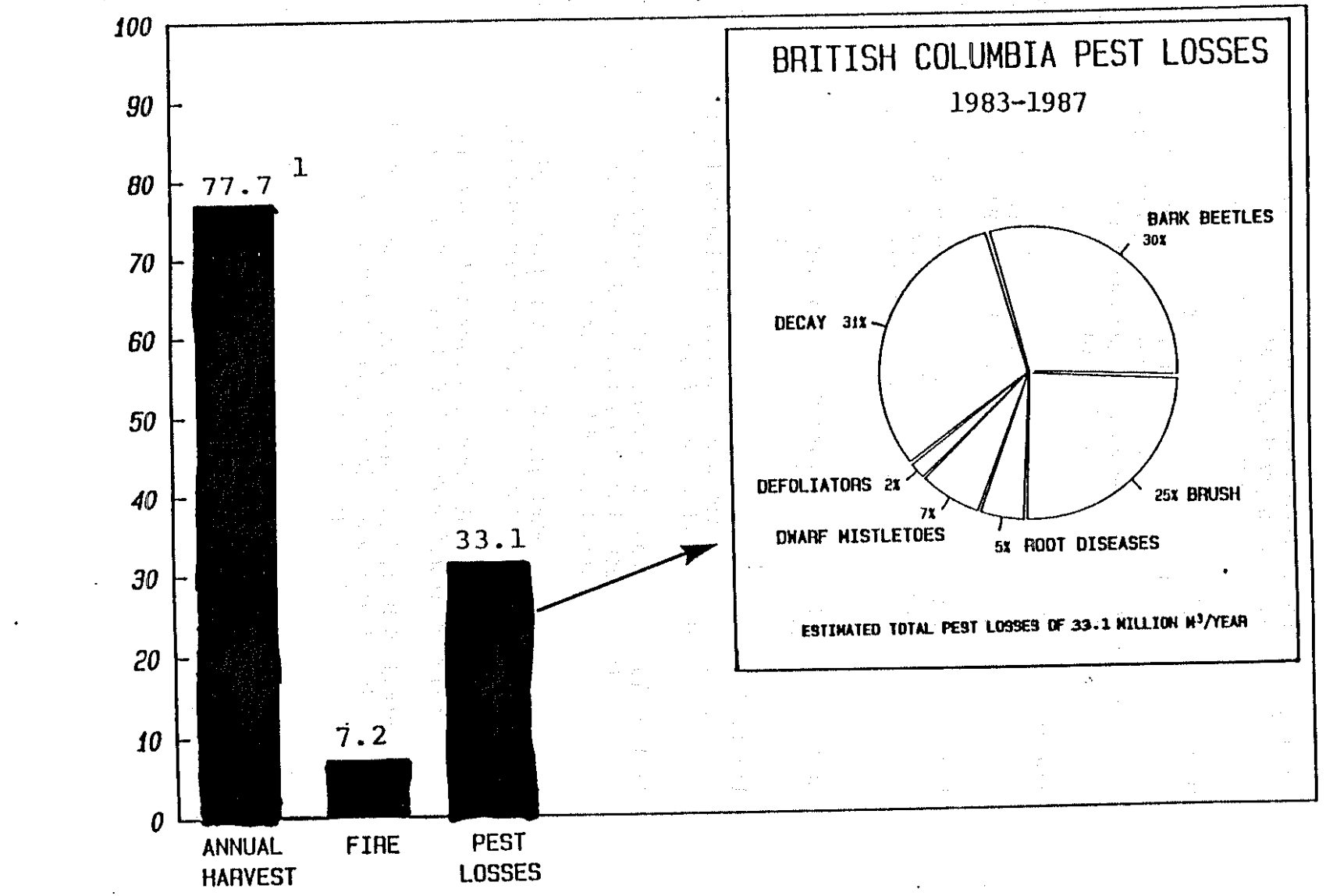
Breakdown by Product:

Asulam = 400 ha
Glyphosate = 38 650 ha
Hexazione = 1 700 ha
2,4-D = 1 250 ha

- Prepared by G. Ackerman, Silviculture Branch, Victoria.

BRITISH COLUMBIA

EST. ANNUAL TIMBER HARVEST, FIRE & PEST LOSSES (GROSS), 1983-1987



Source: CFS & BCFS

1 Annual harvest is for the period 1983-1986

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