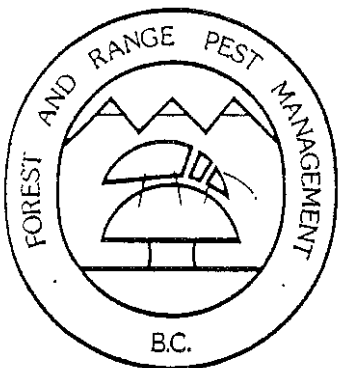




PEST MANAGEMENT PROGRESS

A summary of pest management activities
of the B.C. Ministry of Forests

Vol. 1 No. 1 (File: 190-4 PMP)

May 1982

INTRODUCTION

I take much pleasure in introducing the first issue of Pest Management Progress, a biannual summary report (May, November) of forest and range pest management projects and plans in British Columbia.

The purpose of this in-house report is to inform our associates of important new plans and to share the results of current activities in a timely, concise and comprehensive manner. Your comments on our activities or for the improvement of our report would be appreciated.

It is with great sadness that we dedicate this first issue to the memory of Andy Renwick and Jack Monts, successive Pest Management Coordinators of the Nelson Forest Region. Their enthusiasm, energy and commitment to the early development of pest management within the province were considerable and will long be remembered by their friends and associates.

R.F. DeBoo, Protection Branch, Victoria

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PEST MANAGEMENT PROGRESS

COORDINATING STAFF

Publisher: R.F. DeBoo, Protection Branch
Editor: R.A.V. Jenkins, Information Services Branch

ADVISORS

Forestry: To be named
Pathology: J.A. Muir, Protection Branch
Entomology: P.M. Hall, Protection Branch
Pesticides: J.F. Henigman, Protection Branch
Vegetation Management: R.C. Jones, Silviculture Branch
Range Management: To be named
Research and Development: H.J. Benskin, Research Branch

Address all correspondence to:

Mr. R.A.V. Jenkins
c/o Protection Branch
1450 Government Street
Victoria, B.C.
V8W 3E7

PEST MANAGEMENT-GENERAL

The Forest Pest Management Function. Forest pest management in the Ministry of Forests is a major, although not exclusive, responsibility of the Protection Branch and Protection staff at regional and district offices throughout the province. As stated by W. Young, Chief Forester, "Forest pest management is making significant strides in British Columbia. The B.C. Ministry of Forests has stationed a pest management coordinator in each region and staff at Victoria headquarters has been strengthened to further the work. There are several immediate priorities, including establishment of an accurate inventory of significant pest problems in the province's forests and defining management policies and goals."

H.G. Doerksen, Protection Branch, Victoria

Pest Management Policy. Several important MOF pest management policy statements have been prepared and circulated within the Ministry for internal review and comment. Included are statements on pest detection, pest impact appraisal, management strategies, and a comprehensive information system. Specific statements on the management of dwarf mistletoes, bark beetles, pesticides, root diseases and on other topics will be prepared and processed during 1982.

R.F. DeBoo, Protection Branch, Victoria.

Stand Tending Guidelines. At the request of Silviculture Branch, Protection Branch staff contributed to the revision of insect and disease coverage in this important reference document. Portions of these guidelines will be forthcoming later this year. (Editor's Note: Local Pest Management Guidelines have been prepared by most Regional Coordinators; Protection Branch is working on pest-specific guidelines also.)

P. Diggle, Silviculture Branch, Victoria

Pest Management Training. Two sessions of a course entitled "Advanced Pest Management" are offered by the Forest Service Training School. The R.P.F. accredited course is composed of a short reading component and an intensive 12-day workshop. Instructor Norm Alexander (of BCIT) emphasizes methods of detection, diagnosis, sampling and surveying, and development of control strategies.

R.F. DeBoo, Protection Branch, Victoria

Inventory Branch Manual, Chapter 9. Staff of Inventory Branch have produced two sections (9.3 Disturbance Update using 70 mm photography, 9.4 Major Forest Insect Pests of British Columbia) of their Depletion and Update chapter of interest to pest managers. A third section on major disease problems is nearing completion.

D.M. Fligg, Inventory Branch, Victoria

Seed Production Pest Management. The Silviculture Branch (Victoria) will be conducting and participating in numerous trials relating to pest monitoring and control on both seed orchards and seed production areas. These efforts will be directed against both direct and indirect pests. Control trials are being conducted to compliment the long term biological investigations of the C.F.S. and together they are aimed at developing pest management programs for tree seed production. This year's activities include the following:

Pine (Red Rock)

- monitor populations of coneworms (Dioryctria sp.)
- herbicide trials to control the alternate host of Stalactiform stem rust

Spruce (Skimikin)

- cone crop permitting - fungicide trials to control inland spruce cone rust
- insecticide trials to control cone and seed insects

Douglas fir (various sites)

- systemic insecticide injections for cone and seed insect control

Field assistance will also be given to the CFS in their pheromone development work for the Douglas fir cone moth and the spruce seed moth.

D. Summers, Silviculture Branch, Victoria

FOREST ENTOMOLOGY

Bark Beetles - Emergency Control Program. A submission was made to the Provincial Cabinet in the summer of 1981 requesting a special allocation from the Forest and Range Resource Fund for the purpose of controlling or limiting the spread of bark beetles (notably mountain pine beetle and spruce beetle). The submission was approved in late summer and 7 million dollars was released for spending in fiscal year 1981/82 with an additional 4.4 million dollars to be allotted in fiscal year 1982/83. These funds have been allocated on a project by project basis after consideration of: 1) the scope of the problem to be addressed, 2) the use the money would be put to, 3) the probability of success of the operation proposed, and 4) the benefits to be derived on successful completion of the project.

As of the end of fiscal year 1981/82, there were 72 projects approved including proposals for survey, road access, single tree disposal and trap tree programs. Harvesting schedules have also been coordinated with this program. The use of the rapattack fire suppression crews has also been approved for construction of helispots in remote areas and single tree disposal of infested trees in inaccessible areas. Allocation of the funds by region is given in Table I.

P.M. Hall, Protection Branch, Victoria

Interagency Committee for Control of Mountain Pine Beetle. A committee consisting of representatives from the Canadian Forestry Service, B.C. Ministry of Forests, Alberta Forest Service and Parks Canada has been formed to deal with mountain pine beetle problems in border areas. Six priority areas for B.C. Ministry of Forests activity have been identified. These are: east, middle and north forks of the White River, Palliser River, Upper Cross River and the Elk River. Ground disposal of infested trees has been carried out and will continue in these areas. Rapattack crews will also be involved with these projects. Limited single tree disposal has also been carried out in Kootenay National Park by Parks staff. The Alberta Forest Service has conducted extensive programs to limit the spread of the pine beetle in the southern sector of that province.

P.M. Hall, Protection Branch, Victoria

Pest Management Rapattack. The provincial fire suppression rappel team is prominent in pest management activities, particularly with work associated with bark beetle control. Up to April, 16 crews had constructed 33 helipads, disposed of 81 infested trees, conducted 18 beetle probes and felled 214 spruce trap trees. Further operations are proposed for Prince George and Nelson Forest Regions. This program is considered to be effective and cost-efficient for work in isolated areas. Other pest management applications are being considered.

J. Dunlop and P.M. Hall, Protection Branch, Victoria

Semiochemicals for Mountain Pine Beetle. Dr. John Borden (Simon Fraser University) conducted pheromone research in the Prince Rupert Forest Region in cooperation with Protection Branch and Region staff during the summer of 1981. His research involved a large-scale experiment designed to find improvements to the current mountain pine beetle aggregation pheromone and was incorporated into a beetle control project. Results were promising after one year. Further tests are planned for the summer of 1982. These follow-up tests will develop use strategies of pheromones for the containment and control of the mountain pine beetle. These insect behaviour-modifying chemicals show promise as a tool for pest management.

P.M. Hall, Protection Branch, Victoria
V. Barge, Prince Rupert Forest Region, Smithers

Spruce Beetle Detection. A great deal of interest has been shown in developing the use of colour infrared (CIR) aerial photography for early detection of spruce trees infested by spruce beetle (Dendroctonus rufipennis). Previous work using CIR film for Douglas-fir beetle detection has indicated that tree stress resulting from successful beetle attacks is detectable using CIR approximately 3 months after attack. Detection after this interval is significantly better than existing methods permit and aerial detection would provide considerable cost savings over conventional ground cruising.

A small feasibility study for the use of CIR film for spruce beetle detection will be carried out in the Prince George Forest Region in the summer of 1982. The work will be done by University of British Columbia researchers and funding is being made available by both Protection Branch and Prince George Region Pest Management. The study will attempt to classify all stages of spruce beetle attacked trees and will make use of photography, extensive ground truthing and, potentially, some airborne multi-spectral scanner imagery. Some indication as to the results of the project should be available in the fall of 1982.

P.M. Hall, Protection Branch, Victoria
R. Cozens, Prince George Forest Region, Prince George

Spruce Beetle Trap Trees. Preliminary results from the felled lethal trap tree project showed almost total brood mortality from using half-strength MSMA injected into mature spruce trees. Some repellency of attacking adults, presumably related to the MSMA treatment, was noted. The project will be continued to further assess the effectiveness of half-strength MSMA and to assess the effectiveness in relation to the repellency of various other dosages. A comprehensive report on the effectiveness of spruce trap trees will be prepared after the 1982 field season.

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

Regional Reports on Bark Beetle Programs:

(a) Prince George Forest Region: Activities during the past 6 months were based mostly on the emergency beetle control program. Probe crews working throughout the region identified areas of spruce beetle and mountain pine beetle attack for stand prioritization for harvesting. With excellent licensee cooperation, almost all harvesting was done in infested zones. Deployment of trap trees, trap decks and single tree disposal projects were based on probe information. In spite of a cold winter with above average snowfall, most projects were completed.

A great deal of the 1982-83 regional beetle management program will depend on the availability of emergency funding. Indications suggest a heavy widespread flight of spruce beetles. Probing to delineate fresh attack is essential for prioritization of harvesting activities.

R. Cozens, Prince George Forest Region, Prince George

(b) Prince Rupert Forest Region. In November, 1980, this Region prepared a detection and control plan for the control of mountain pine beetle. After evaluation of the problem, it became obvious that the normal pest management budget allocations were not sufficient to allow the comprehensive detection and control action required to prevent infestation spread and to allow control within a planned 3-year period.

As a result, a request for special funding was presented to the Ministry Executive. This submission, coupled with others, led to the special allocation from the Forest and Range Resource Fund. Upon receipt of the apportionment for this Region (Table I) in October, 1981, seven projects were undertaken immediately, and a comprehensive detection program was undertaken by the six Forest Districts involved.

Since then, the spruce beetle infestation was also found to be much more extensive than originally suspected. Accordingly, an intensive harvesting and trap tree program (11,507 trap trees to date) was initiated.

V. Barge, Prince Rupert Forest Region, Smithers

(c) Cariboo Forest Region. The Cariboo Region conducted a comprehensive aerial survey for mountain pine beetle, spruce beetle and Douglas-fir beetle during July - September 1981. This was the first intensive survey conducted by the Ministry (previously the Ministry relied upon the C.F.S. with supplemented specific flights). Inventory personnel, in cooperation with Pest Management and Air Operations staff, have developed an "Aerial Survey - Sketch Mapping Manual." Basically, the method involves grid flying with the observers on the same side of the aircraft using previously-coloured 40 chain maps (1:40,000) in 1982. The results were excellent: The accuracy greatly enhanced the efficiency of the probe and cruising crews. This regional aerial survey will be conducted again in 1982.

The bark beetle control program in this Region concentrated on accessing infested stands, sanitation treatments, and trap tree programs. Also, a log-hauling ban will be enforced during the mountain pine beetle flight period (July 12 - August 20). The control program will continue during fiscal year 1982-83 subject to available funding.

D. Doidge, Cariboo Forest Region, Williams Lake

(d) Vancouver Forest Region. The Manning District of the Parks and Outdoor Recreation Branch (Ministry of Lands, Parks and Housing) has decided to control a 40 hectare attack of mountain pine beetle at Eastgate in Manning Park in order to protect the valuable recreation facilities and opportunities of the Park. About 3700 green attacked pine trees have been marked for a "fall and burn" operation scheduled for April and May of this year.

P.M. Wood, Vancouver Forest Region, Vancouver

(e) Kamloops Forest Region. Control activities to date have been summarized in Table II. Plans for 1982-83 include 8 projects ranging from road access construction to detection surveys and control programs for mountain pine, spruce and Douglas-fir beetle infestations. The Rapattack crew is being used for some single-tree disposal projects (i.e. in the Vernon, Penticton, Merritt and Lillooet Forest Districts) and for the construction of heliports for future access.

R.D. Edward, Kamloops Forest Region, Kamloops

(f) Nelson Forest Region. As in other Regions, Nelson is heavily committed to bark beetle management via road construction, sanitation harvesting and trap tree activities. The Mountain Pine Beetle Interagency Committee commitments are under the supervision of regional and district office pest management staff. In addition, a series of discussions between MOF personnel, Nelson Region, and Provincial Parks personnel has resulted in a letter of authority granting the MOF permission to undertake a lethal trap tree program to control spruce bark beetle in Top-of-the-World Park. With the MOF and the forest industry undertaking a number of trap tree programs in drainages surrounding the park, it is felt that an untreated, expanding infestation within the park boundaries was unacceptable. Following MOF ground probes within the park, the drafting of a trap tree program proposal, and the presentation of this proposal to Parks, permission was granted to fall 580 lethal trap trees within 125 ha of the park. Parks and MOF and personnel will continue to cooperate throughout the duration of the program to ensure that the program meets with everyone's satisfaction.

D. Gray, Nelson Forest Region, Nelson

Sitka Spruce Plantation Surveys for Weevil Attack. As part of a comprehensive program to develop weevil (Pissodes strobi) management strategies, plans have been formulated to map and survey all Ss plantations during 1982 and 1983. TFL plantations will be included in this project.

P. Wood, Vancouver Forest Region, Vancouver.

Sampling for Pissodes strobi Attack. In cooperation with Pest Management Coordinators at Smithers, Williams Lake and Vancouver, intensive surveys for weevil damage were conducted near Bella Coola during 1981. The information gathered, plus additional data to be acquired during 1982, will hopefully provide sufficient information for the development of a reliable and practical sampling method for this important pest. Evaluation of data will be undertaken during the winter period, 1982-83.

R.F. DeBoo, Protection Branch, Victoria

Leader Clipping for Control of Pissodes Weevils. Initiated during 1979, leader clipping trials will be conducted annually during a 5-year period. Contiguous drainages will be surveyed annually to compare population fluctuations within clipped and unclipped areas for appraisal of the technique.

P. Wood, Vancouver Forest Region, Vancouver

Operational Spray Trials for Control of Douglas-fir Tussock Moth. Small-scale trials using a nuclear polyhedrosis virus (NPV) against the tussock moth were conducted in the Similkameen Valley near Hedley during 1981. The cooperative

project (CFS, Region, Protection Branch), which included both ground and aerial applications, indicated that the introduction of the virus at an early infestation stage significantly lowered insect populations although little foliage protection was achieved, possibly due to weather factors. There were also indications that the virus dispersed through stands faster than was formerly thought and this would have implications on developing new, more efficient, application methods. The residual effect of the virus and its effect on the insect population a year after virus application will be assessed in the summer of 1982.

Further trials using NPV, Bt, carbaryl and permethrin will be carried out in 1982. The largest test will be aerial applications of NPV at reduced dosage rates. The other agents will be applied from the ground to test for efficacy.

DFTM populations increased throughout the insect's range with defoliation occurring at Hedley, Armstrong, Vernon, Ollalla and Pritchard. Some control operations will be undertaken in the most severely infested areas.

A DFTM slide-tape information program was developed and distributed to each District office in response to growing concern for this pest. Participation at public forums has been a major involvement for Kamloops and Victoria staff.

R.D. Edward and R. Chorney, Kamloops Forest Region, Kamloops
P.M. Hall, Protection Branch, Victoria

Western Spruce Budworm. Although current infestations of western spruce budworm are much reduced over past years, studies are still progressing to develop treatment alternatives. The Canadian Forestry Service (Forest Pest Management Institute and Pacific Forest Research Centre) will be undertaking a trial using both a nuclear polyhedrosis virus specific to budworm and a granulosis virus. Preliminary tests carried out in 1981 indicate promise for both agents. The Ministry of Forests will provide limited support for this project.

P.M. Hall, Protection Branch

FOREST PATHOLOGY

Mistletoe Management - General Activities. In addition to the drafting of policy and guideline documents, a variety of other assignments will be undertaken during 1982-83. These will include the development of systems for survey and inventory of mistletoes in cooperation with the CFS, Silviculture and Inventory Branches, and several Regional and District Forest Service offices. A study to determine the effects of mistletoe on timber supplies in a Timber Supply Area will be undertaken with Planning and Development, Protection Branch and other Branches. A computer model (LPMIST) to manage lodgepole pine mistletoe on a site-specific basis will be evaluated and adapted to B.C. conditions. Plots will be established in cooperation with interior B.C. Regional and District personnel to gather mensurational and mistletoe data. For hemlock mistletoe in coastal B.C., a workshop is proposed to demonstrate survey methods, new impact data and control options using computer simulation in cooperation with the Canadian Forestry Service. Data analyses and planning for this session are underway. A field demonstration lodgepole pine mistletoe control project for the Cariboo Region was planned and reviewed. The objectives will be to show clean-up practices following harvesting and sanitation during spacing of young stands.

J.A. Muir, Protection Branch, Victoria

Mistletoe in the Cariboo. Lodgepole pine dwarf mistletoe is recognized as the most damaging disease problem in the Cariboo. To reduce losses to the parasite, a Regional "operations guideline" has been implemented. A supplement to the guidelines is "Managing lodgepole pine dwarf mistletoe in the Cariboo Forest Region" by Alan Vyse, Regional Research Forester.

An experiment (E.P. 910.01) testing the effectiveness of a strip of standing dead lodgepole pine to intercept dwarf mistletoe seeds along an infected cutblock edge was established. The filter was not effective in stopping seeds. However, the data recorded for flowering time, time of seed release, seed flight distance, and seedfall concentration was within the range of reported observations (U.S.) for lodgepole pine dwarf mistletoe.

A survey of Williams Lake Forest District pine type cutblocks will be carried out this summer to assess dwarf mistletoe infestation levels in the regeneration. Based on the amount of dwarf mistletoe present, stand density, and tree growth, recommendations will be made for stand rehabilitation.

T. Wilford, Cariboo Forest Region, Williams Lake

Evaluation of Stump Pulling for Root Disease Control. In the past, many stump pulling operations have been tried in B.C. and Washington State to control the root diseases Phellinus weirii and Armillaria mellea. Various methods and types of equipment have been used, and various site conditions, special problems and costs have been encountered.

A study is being conducted through Pest Management in the Vancouver Region to coalesce relevant information from all previous stump pulling operations in B.C. and Washington. This information package will be used to formulate a series of operational trials designed to determine the most effective equipment and methods for stump pulling.

P.M. Wood, Vancouver Forest Region, Vancouver

(Editor's Note: Several other planned root disease activities, including a joint project with UBC to evaluate inoculation of interior Douglas fir, sanitation cutting trials, and site analyses will be reported in the next issue of this report.)

Root Disease Analysis Survey. An analysis design for the assessment of root disease in the Vancouver Forest Region has been developed in order to:

- a) provide an estimate of root disease impact, particularly Phellinus weirii (Murr.) Gilbertson, in the Quadra and Nootka T.S.A.'s.
- b) provide a data base for the development of specific ecosystem association disease management guidelines.
- c) assess the ongoing pathology objectives of Pest Management planning.

Survey Design and Domain. The above objectives will be met through a randomized three-block design with factorial treatments of several strata levels, in the most productive coastal Douglas-fir ecosystems. The 1982 survey season aims for sampling three 20 ha replicates in each of the 36 fir type groups/site class/ age class/ strata (3 X 3 X 4 resp.) per biogeoclimatic subzone variant sampled, for a total of 216 samples or 4320 ha. The subzone variants to be sampled are the Nanaimo and Georgia Wetter Maritime Coastal Douglas-fir, CDFb1, and the East Vancouver Island Drier Maritime Coastal Western Hemlock, CWHa2. Both variants comprise large portions of the noted T.S.A.'s in Campbell River, Powell River, Port Alberni and Duncan Forest Districts.

Methods. The root diseases listed below will be identified and separately ground estimated using the Intersection Length Estimation method plus mapping option (Bloomberg et al 1980). A systematic, 2 grids by 4 lines transect design will be used to sample each 20 ha replicate.

- Phellinus weirii (Murr.) Gilbertson,
- Armillaria mellea Vahl. ex. Fr.,
- Verticicladiella wagenerii Kend.,
- Fomes annosus (Fr.) Cke.,
- Polyporus schweinitzii Fr.

Sub-sampling in each replicate will include mensuration data collection, stand history and ecosystem association measurements.

Analysis and Interpretation. The Root Rot Analysis (RRSAMP) Fortran IV Program (Bloomberg et al 1980) will be used to analyze the field data. The stratified results of disease incidence and intensities can then be applied to the T.S.A. productive land bases to estimate the area visibly affected by root diseases.

The RRSAMP estimates will then provide the basis for projecting disease spread and increment losses within specific strata, with the use of stand disease predictor models.

An examination for possible interactions between the strata with respect to root disease incidence and disease intensities will be done through an analysis of variance. The survey design is constructed around the ANOVA requirements.

The sub-sampling for mensuration data will assist in defining the replicates' strata, important for the allocation and analysis of collected data.

Stand history data will be examined for possible interactions with root disease incidence and intensity.

Two data compilation programs will assist in examining for possible environmental and ecosystem association interactions with root disease incidence and intensity.

In the final analysis, the survey will provide estimated root disease impacts in the Quadra and Nootka T.S.A.'s, and a wealth of other quantified mensurational, stand history and ecosystem association data to be examined for significant interactions that will be useful in developing root disease management guidelines.

J.D. Beale, Vancouver Forest Region, Vancouver.

Hemlock Seedling Blight. Surveys and liaison activities will be continued for a new disease on western hemlock container seedlings discovered last year at Aldergrove. A draft policy to deal with new disease introductions is being prepared.

J.A. Muir, Protection Branch, Victoria.

FOREST VEGETATION MANAGEMENT

Vegetation Management - General. Since 1974, Silviculture Branch has used herbicides to control unwanted vegetation to release conifers from brush competition or to prepare sites for planting. During 1981, herbicides were applied to cover 10,000 ha by the forest industry while the Ministry of Forests treated approximately 5000 ha. Application methods include hack & squirt injection and aerial and ground spraying. The major herbicides used include Krenite, 2,4-D Amine, M.S.M.A., and Roundup.

Silviculture and Engineering Branches have cooperated in developing new equipment for applying herbicides. An ultra-low volume (U.L.V.) sprayer combining the head and spinning disc of the production micron-herbi, and the tank of a regular knapsack sprayer is in use.

A new development suspends the same head of the U.L.V. herbi from a steel line attached to two adjustable poles with downrigger gear that allows the equipment to function much like a mini-skyline system. Our studies show that U.L.V. systems increase productivity due to lesser time needed for refilling and solution mixing (conventional low volume knapsack sprayers require applications of 250 l/ha or better vs. U.L.V. systems of about 20 l/ha). Also, the spinning disc and the droplet and spray pattern produced appears to provide greater treatment efficacy than the conventional ground sprayer.

New stem injection equipment to replace the hack & squirt system has been developed by Brian Dillistone of Simon Fraser University. The Wee-Do system automatically raises glyphosate impregnated capsules to the tip of an injector lance thus solving the reload problem and permitting continuous operation.

In addition, Engineering Branch are developing a new lance that allows herbicide to flow into a stem cut without hazard to the operator from herbicide contamination.

Over the last four years, the Silviculture Branch, with regional cooperation, has demonstrated the potential of controlling vegetation. Brush trials in the ESSF subzone and control work in Peace River grass have produced good results. New trials will examine the efficacy of Garlon, Tordon and Roundup for controlling salal. Also injection work, using herbicide pellets for spacing older trees, is in the planning stage.

J. Gilmour and G. Ackerman, Silviculture Branch, Victoria

Vegetation Management - Seed Orchards. Two weed control trials were conducted in clonal interior spruce orchards located at the Kalamalka Seed Orchard site (lat. 50°14', long. 119°117') near Vernon. Each experimental unit consisted of one ramet and a treatment applied 1.44m² around the base of each ramet. Treatments were replicated five to six times in a completely randomized design.

The first trial evaluated six weed control treatments (black plastic, white plastic, simazine 2.2 kg a.i./ha, sawdust, glyphosate 1.2 kg a.i./ha, wood chips) and concluded that black plastic significantly controlled the weeds but was expensive and that simazine was the most effective and economical weed control treatment. A report on this trial (SX81-601-K) is available.

The second trial was designed to identify economical and effective simazine and glyphosate application rates for weed control. Simazine was applied at rates of 2.2 kg a.i./ha, 2.75 kg a.i./ha and 3.3 kg a.i./ha and glyphosate at rates of 1.2 kg a.i./ha, 3.7 kg a.i./ha and 6.2 kg a.i./ha. The simazine treatments resulted in total weed control and the glyphosate treatments resulted in partial weed control.

Weed control trials utilizing simazine, glyphosate and linuron will be conducted in 1982. Continued evaluation of herbicide efficiency and safety will be conducted.

Paul Birzins, Kalamalka Research Stn. and Seed Orchard, Vernon

(Editor's Note: Several other proposed projects involving site rehabilitation and site preparation will be reported in the next issue)..

Standard Working Plan for Herbicide Research Trials. Under the current system for pesticide application permits, unregistered herbicides can be used for research purposes only. This restriction places distinct limitations and requirements upon all Ministry personnel who wish to use this category of herbicides. The use of unregistered herbicides is permitted provided that two major conditions are met:

- 1) That the primary objective of application is the acquisition of scientific data. This objective requires an acceptable working plan and experimental design, pre and post-treatment assessment reports.
- 2) That research trial applications will be limited in size.

A draft standard working plan has now been prepared by John Pollack (FRO, Smithers) and is currently undergoing technical review. It is an adaptation of the CRAFTS (Coordinated Research on Alternative Forestry Treatments and Systems for forest vegetation management - Oregon State University) field manual in that test sites are smaller and require less time to install and monitor. The utility of the working plan as a provincial standard will be jointly evaluated by Research, Silviculture and Protection Branches.

H.J. Benskin, Research Branch, Victoria.

RANGE PEST MANAGEMENT

Noxious Weed Control Program. The Range Section, Cariboo Forest Region, operated a weed control program aimed at preventing the spread of noxious weeds as specified in the Weed Control Act. Control efforts are directed primarily at the knapweed species using Tordon 22k on a spot treatment basis. Communication is maintained with the Knapweed Containment Committee located in Kamloops.

1981 Summary. One spray crew operated in the Region, concentrating on the 100 Mile House District. The following table summarizes, by species, the area treated in 1981.

Diffuse knapweed	14.5 ha
Canada thistle	9.5
Spotted knapweed	5.0
Burdock	3.7
Russian knapweed	.8
Houndstongue	.7
Leafy spurge	<u>.1</u>
Total	34.3 ha

A total of 25.3 kg (a.i.) of picloram was used on this area.

1982 - Proposed Program. In 1982, two spray crews will operate in the Cariboo. One crew will work exclusively in the 100 Mile House District, primarily in the Clinton area. The second crew will work in the Williams Lake, Horsefly, Chilcotin and Quesnel Districts. This crew will concentrate on the knapweed species along the Fraser River Valley and nodding thistle in the Alexis Creek area.

Time permitting, all sites sprayed in 1981 will be evaluated and seeded to grass species if control was adequate.

G. Le Roux, Cariboo Forest Region, Williams Lake

PESTICIDES

Computerized Forest Pesticide Use Data Retrieval System and Use Inventory.

Information pertaining to forest pesticide applications under permit by the Ministry of Environment is being entered into a computer for storage and subsequent retrieval. The data in this program includes the following types of information: pesticide type, pest and crop tree types, site conditions and extent of the treatment, methods of application and timing, environmental and health related issues, efficacy follow-up and costs.

A summary of B.C. forestry pesticide use has been published in "1979-1981 Forestry Pesticide Use Inventory, P. Downey and J. Henigman, Forest Service Internal Publication, PM-PB-2." Subsequent publications will be prepared in the coming years using the computer data storage.

The computer data base and summary reports will provide B.C. forestry with treatment efficacy and cost data which are presently not easily available from present sources.

J.F. Henigman, Protection Branch, Victoria

Forest Pesticide Use Pamphlet. A general interest pamphlet is planned for publication this year to provide public information on how pesticides may be applied in B.C. forestry practices. A summary of the M.O.F. position paper "Pesticides in Forest Management," will provide the basis for the text. Three issues: (1) the need for forestry pesticides, (2) the capability of forestry personnel to use pesticides correctly, and (3) the regulation of our pesticide use by other governing agencies will be discussed. Graphic illustrations will also occupy a significant part of the pamphlet.

J.F. Henigman, Protection Branch, Victoria

Slide-Tape Show for Pesticide Applicator Training. A slide show with a prepared professionally recorded text is planned to be assembled to aid in training forestry pesticide applicators. The slide show will likely be of a fifteen minute duration and would cover pesticide safety and careful application methods. Specific details of the slide show contents have not been fully determined.

J.F. Henigman, Protection Branch, Victoria.

Ad Hoc Committee on Forest Pesticides. As a result of concern for the use and regulation of forest pesticides, a series of official position papers were drafted by representatives from a variety of organizations (Ministry of Forests, Ministry of Environment, Ministry of Health, Council of Forest Industries, and the Association of B.C. Professional Foresters). The papers

were presented to and accepted by the Ministers of Environment and Forests in September, 1981. The Committee plans to use these statements to foster better understanding of and non-confrontation dialogue on pesticide applications in this province.

R.F. DeBoo, Protection Branch, Victoria

Ministry of Forests Pesticide Use Permit Applications. A total of 94 Ministry of Forests pesticide use permit applications have been processed to date and sent to the Ministry of Environment, Pesticide Control Branch, for assessment and approval. The information involved with these applications is being entered into a computer for convenient recall and summary. There are presently 30 operational and 17 research permit applications for herbicide use, 6 operational and 40 research permit applications for insecticide use, and 1 operational permit application for fungicide use.

J.F. Henigman, Protection Branch, Victoria

Forest Pesticide Use Handbook. A new Forest Pesticide Use Handbook has been proposed as a joint project to be funded by the Ministry of Forests and the Council of Forest Industries of B.C. This publication will replace the old "Forest Pesticide Handbook" written in 1975. Agreement to undertake this project should be formalized in the near future.

It is intended that the handbook be of a binder type format allowing prompt and continuous updating of material as required. All aspects of forestry pesticide use will be included: legislation, policy, pest management, the pesticides, equipment, application techniques, storage and transportation, safety and emergency information.

During this year, a Table of Contents will be confirmed. Assistance in this matter will be presently sought from a number of operational foresters involved with pesticides in their pest control operations. Some of the introductory chapters of the handbook will be completed as well in 1982. Publication of the handbook should occur in 1983.

J.F. Henigman, Protection Branch, Victoria

Forest Pesticide Administration Applicator Training. Pesticide applicator training has been conducted as a regular function of the Protection Branch pesticide administration responsibility. The information offered students has included general pest management philosophy and policy, registration procedures, the provincial permit system, forest pesticides and their use, and health and environmental consideration.

The following is a list of the courses given since October 1981:

- Silviculture Administration Course: Green Timber, 5 sessions: 75 students total

- Pesticide Control Branch Applicator's Certification Course: Courtenay, Nanaimo, Prince George, Kamloops, Clearwater, Cranbrook, Castlegar, Clearbrook: 270 students total

- Vegetation Management Course: Chilliwack, Sechelt, Parksville: 60 students total

In addition, pesticide applicator courses were completed at Golden, Williams Lake and Smithers by regional MOF staff.

J.F. Henigman, Protection Branch, Victoria

(Editor's Note: Pest Management staff from Williams Lake, Prince George and Victoria have been guest lecturers at various universities and colleges during 1981-82 including UBC, SFU and BCIT.)

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

Protection Branch

R.F. (Bob) DeBoo, Manager, Pest Management, Victoria, 387-5965
P.M. (Peter) Hall, Forest Entomologist, Victoria, 387-5965
J.F. (John) Henigman, Pesticide Specialist, Victoria, 387-5965
J.A. (John) Muir, Forest Pathologist, Victoria, 387-5965
Vacant, Pest Management Planning Specialist, Victoria, 387-5965
Vacant, Pest Management Forester, Victoria, 387-5965
S.P. (Stuart) Taylor, Pest Management Technician, Victoria, 387-5965
C. (Chris) Wilson, Pest Management Technician, Victoria, 387-5965
P. (Pat) Downey, Pest Management Technician, Victoria, 387-5965

Silviculture Branch

D. (Don) Summers, Seed Production Pest Management Officer, Victoria, 387-1191
J. (Jacob) Boateng, Brushing and Weeding Specialist, Victoria, 387-1191

Inventory Branch (partial involvement only)

D.M. (Doug) Fligg, Manager, Depletion and Update, Victoria, 387-1345
B.M. (Brian) Hall, Depletion Officer, Victoria, 387-1814
J. (John) Kiss, Decay and Waste Officer, Victoria, 387-6729
S. (Steve) Ilnytzky, Depletion Coordinator, Victoria, 387-1814
R. (Ray) Leduc, Depletion Coordinator, Victoria, 387-5436
R.E. (Rick) Woods, Depletion Coordinator, Victoria, 387-1814
K.S. (Ken) Richardson, Decay and Waste Coordinator, Victoria, 387-6729
L.E. (Lloyd) Wilson, Decay and Waste Coordinator, Victoria, 387-6729

Cariboo Forest Region

D.F. (Don) Doidge, Pest Management Coordinator, Williams Lake, 398-7121
E.H. (Ted) Wilford, Forest Pathologist, Williams Lake, 398-7121
K. (Kathy) Shane, Forest Entomologist (June), Williams Lake, 398-7121
M. (Mark) Hamm, Pest Management Technician, Williams Lake, 398-7121

Kamloops Forest Region

R.D. (Ron) Edward, Pest Management Coordinator, Kamloops, 374-7741
R.J. (Rick) Chorney, Forest Entomologist, Kamloops, 374-7741
C. (Cherri) Campbell, Specialist, Pest Management Training, Kamloops, 374-7741
Vacant, Specialist, Entomology/Pathology, Kamloops, 374-7741
T. (Tom) Lacey, Resource Officer, Protection, Merritt, 378-6171
E. (Eric) Haupt, Pest Management Officer, Vernon, 542-0264
H. (Howard) De Long, Pest Management Technician, Salmon Arm, 832-7153
J. (Jim) Paynter, Pest Management Technician, Penticton, 492-8721
M. (Monika) Fuchs, Pest Management Technician, Princeton, 295-6988
K. (Ken) Brewster, Pest Management Technician, Princeton, 295-6988
E. (Earl) Holly, Pest Management Technician, Lillooet, 256-7531

Nelson Forest Region

Vacant, Pest Management Coordinator, Nelson, 354-4181
D. (Dave) Gray, Forest Entomologist, Nelson, 354-4181
S. (Steve) Byford, Pest Management Officer, Cranbrook, 426-3391
D. (Dunc) Hamilton, Pest Management Officer, Invermere, 342-9257
L. (Larry) Price, Pest Management Officer, Golden, 344-5991
A. (Archie) McConnachie, Pest Management Officer, Revelstoke, 837-6111
D. (Doug) Fellman, Pest Management Officer, Arrow, 365-8402
L. (Larry) Larsen, Pest Management Officer, Boundary, 442-2766
K. (Ken) Jardany, Pest Management Officer, Kootenay Lake, Creston, 428-2030

Prince George Forest Region

R.D. (Russ) Cozens, Pest Management Coordinator, Prince George, 564-0778
R.S. (Bob) Hodgkinson, Forest Entomologist, Prince George, 564-0778
D.J. (Duke) Sample, Pest Management Technician, Prince George, 564-0778

Prince Rupert Forest Region

V.G. (Vern) Barge, Pest Management Coordinator, Smithers, 847-4511
A.J. (Art) Stock, Forest Entomologist, Smithers, 847-4511
M. La Rock, Forest Pathologist, Smithers, 847-4511

Vancouver Forest Region

P. (Paul) Wood, Pest Management Coordinator, Vancouver, 668-2501
J.D. (Jeff) Beale, Forest Pathologist, Vancouver, 668-2501
Vacant, Forest Entomologist, Vancouver, 668-2501

MEETINGS OF INTEREST

Interagency Meeting for Spruce Weevil Research and Development Coordination.

A meeting was held in Vancouver on 24 March 1982 to discuss and coordinate current and intended research into "Spruce" Weevil (Pissodes strobi) in B.C. Attendees included representatives from the University of British Columbia, Simon Fraser University, Pacific Forest Research Centre, (C.F.S.), the Forest Research Council, Research Branch (M.O.F., Victoria), Research Section (M.O.F., Prince Rupert Region), and Pest Management (M.O.F., Vancouver Region). A representative from the University of Washington was unable to attend. In summary, the immediate need for weevil impact assessments on affected spruce plantations was identified. This assessment is required in order to place continued research into direct and indirect control techniques into the current context of the weevil problem. Current research into direct control techniques is minimal. Research into resistant spruce genotypes, preventative techniques and silviculture strategies is being emphasized. A summary list of current and intended activities is available upon request.

Paul Wood, Vancouver Forest Region, Vancouver

Meetings with Vegetation Management Topics on the Agenda.

- Silviculture Officers' Meeting, Campbell River, May 3-5
 - Northern Silviculture Committee Spring Workshop, Fort St. John, June 16-17
 - Northern Silviculture Committee Seminar, July 19
- (Herbicide application equipment will be demonstrated at Campbell River and Fort St. John)

J. Gilmour, Silviculture Branch, Victoria

Meetings in the Cariboo. The Cariboo Region held a meeting for all the District Resource Officers, Protection, in February, 1982. During the time devoted to pests - either insect or disease - the Resource Officers were brought up-to-date on the latest problems, on a District, Region and provincial basis. Methods of control were discussed as well as upcoming training, seminars and courses.

To continue the process of technology transfer, disease identification seminars are planned for the spring and summer.

Over 20 Ministry personnel attended a Pesticide Applicators Course, April 6-8.

D. Doidge, Cariboo Forest Region, Williams Lake

East Kootenay Insect and Disease Control Committee. At the March 9 meeting of the East Kootenay Insect and Disease Control Committee (E.K.I.D.C.C.), the committee again showed itself to be an important force in the direction and implementation of insect and disease control efforts in the east Kootenays.

Attendance included persons from 10 licensees; MOF from 4 districts, the Nelson Region, and Victoria; and Fish and Wildlife. Discussions centered on the new five year master salvage plan, memorandums of agreements for salvage/sanitation logging, an update of the pest situation in the east Kootenays, and plans for the coming year. Copies of the minutes are available from Mr. L. Price (Secretary, E.K.I.D.C.C.).

D. Gray, Nelson Forest Region, Nelson

Kamloops Region Training Sessions. As part of a continuing program, training sessions on the identification, detection and monitoring of forest insect pests will be conducted for District office personnel during the next 6 month period.

R.D. Edward, Kamloops Forest Region, Kamloops

Pesticide Registration Authorities to Visit B.C. Representatives from Health and Welfare Canada and Agriculture Canada, Ottawa, will be the guests of the Forest Pest Review Committee in July. The federal authorities will meet with selected members of government and industry to discuss issues related to pesticide registration and regulation. A field trip is planned to view vegetation management situations and the need for an array of approved chemical herbicide/silvicide treatments in this province.

W. Young, Chairman, Forest Pest Review Committee, Victoria

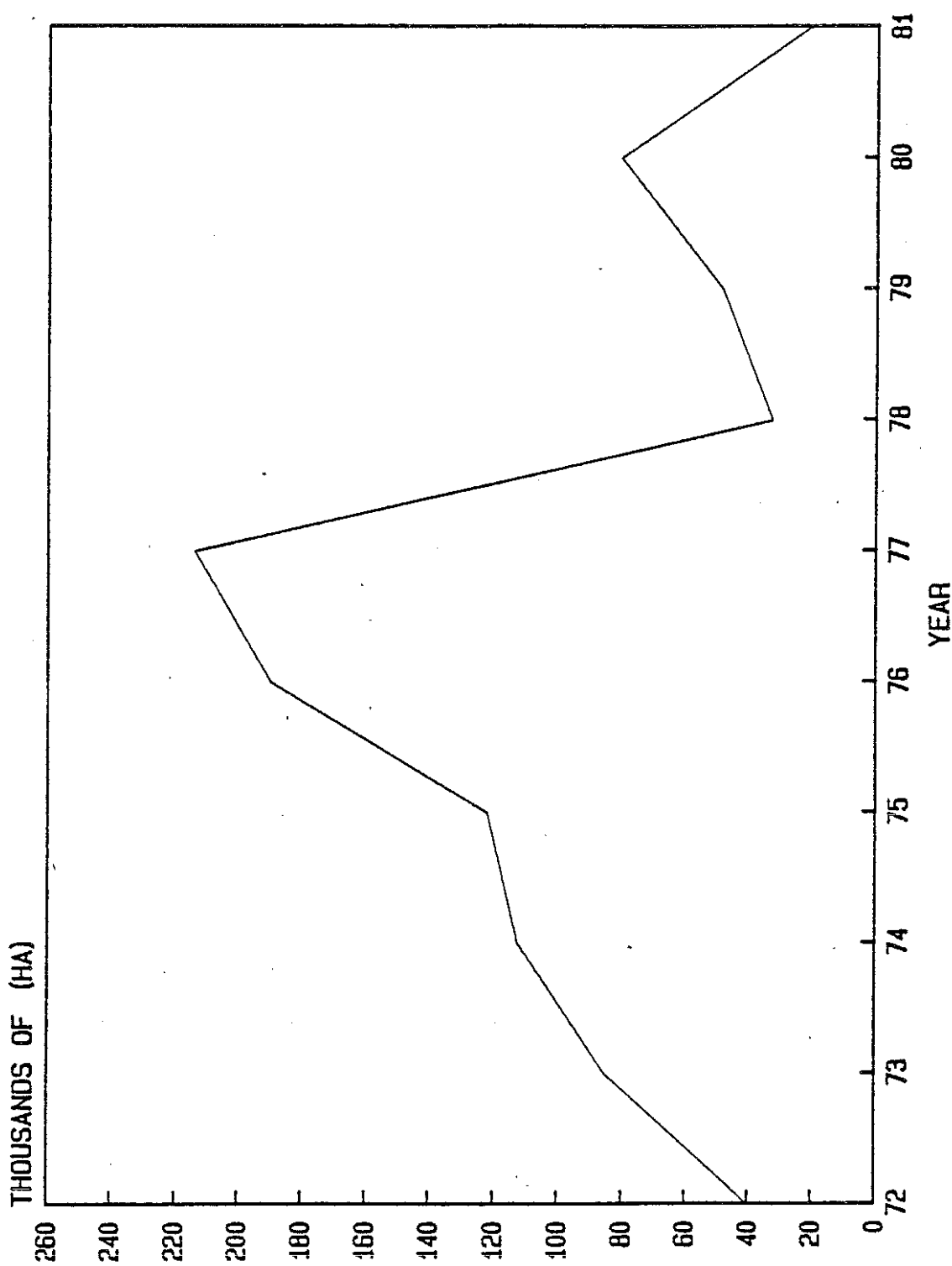
TABULATIONS AND GRAPHICSTABLE 1. ALLOCATIONS OF BARK BEETLE FUNDING 1981/82

	<u>NO. OF PROJECTS</u>	<u>ALLOTMENT</u>
A. <u>REGION</u>		
Cariboo	12	2 200 010
Kamloops	8	1 696 705
Nelson	31	1 121 000
Prince George	11	603 133
Prince Rupert	8	1 138 141
	<u>70</u>	<u>6 758 989</u>
B. <u>SPECIAL PURPOSE</u>		
Timber Management	1	16 000
Rapattack (projects throughout B.C.)	1	225 011
	<u>72</u>	<u>7 000 000</u>

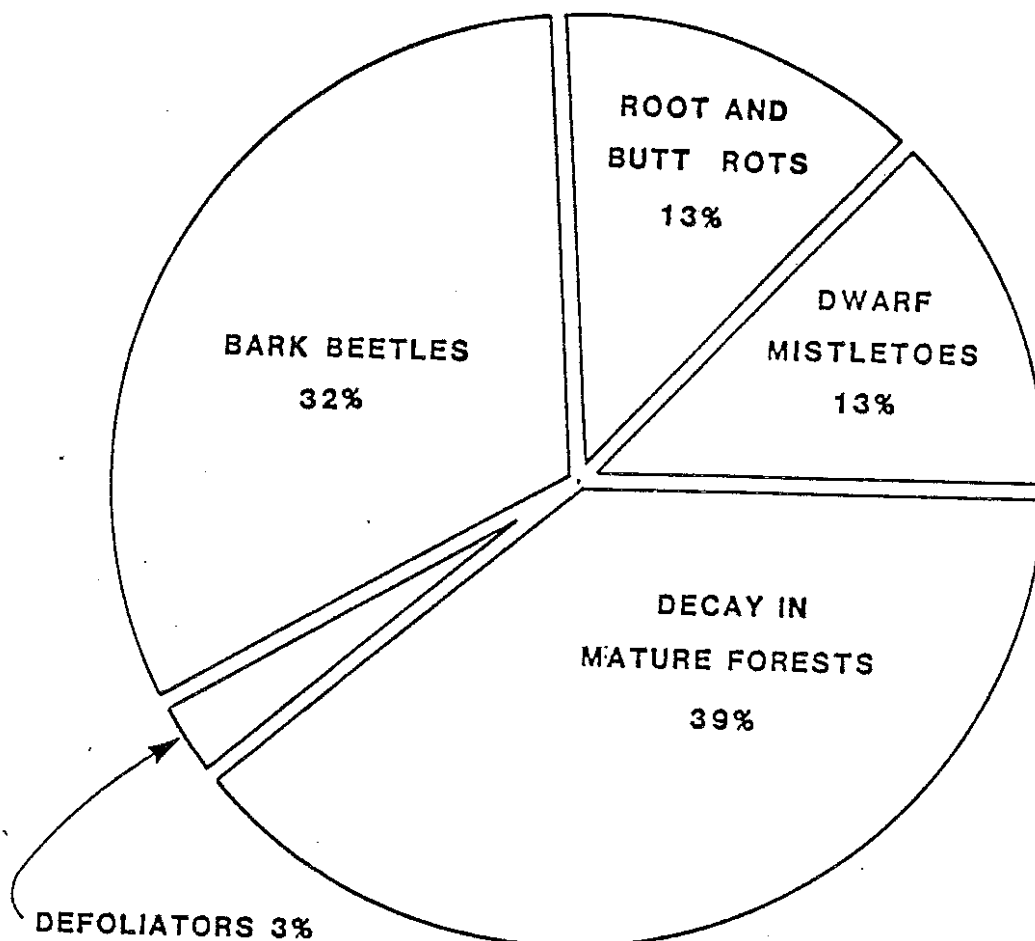
OCTOBER 1981 - APRIL 1982

1 Area in hectares
2 Volume in cubic meters
N/A Not Available

0151626
TRENDS IN DEFOLIATION OF DOUGLAS FIR
CAUSED BY THE WESTERN SPRUCE BUDWORM
IN BRITISH COLUMBIA (YEARS 1972 - 1981)



PEST CAUSED LOSSES 1977-81



-ESTIMATED TOTAL PEST CAUSED LOSSES OF
~25.5 MILLION CUBIC METRES/YEAR

SOURCE: FIDS UNIT, P.F.R.C.

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