A REVIEW OF PEST MANAGEMENT TRAINING IN THE B.C. FOREST SERVICE

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ABSTRACT

As a result of a resolution at the December 1984 Pest Management Meeting, a task force was established to review pest management training needs in the B.C. Forest Service, and to make recommendations to Directors, Forest Protection and Personnel Services Branches.

The task force assumed that training was most urgently needed at the District level where pest management is implemented. Training must be flexible to accommodate the need for short courses, but comprehensive to encompass the scope of pest management activities within the province. Therefore a modular format is required.

The task force elaborated the subject areas that should be developed as training modules, including pest management strategies, pest identification, surveys, control methods, damage appraisal and Forest Service organization. The task force suspected that one or more modules on pest identification was the most urgent requirement.

A questionnaire was developed to survey the needs by personnel for pest management training and to solicit opinion on the modules. The questionnaire and outline of modules should be circulated to District, Region and Branch staff.

In response to the concerns expressed in 1984 about the Advanced Forest Pest Management Course, the task force concluded that the course, although adequate in 1981 for the purpose that it was developed, was unsuitable for current, more specific and wide-ranging requirements. The task force recommended that any pest management training course developed by an external agency must be approved by the Director, Protection Branch, prior to use by Forest Service personnel for training.

Finally, the task force recommended that the training modules outlined here should be developed by consultants or contractors according to specifications, including learning or training objectives, provided by the Forest Service. A pest management training committee should be appointed to review currently available pest management courses which might be suitable, and coordinate the development of specific training modules.

TABLE OF CONTENTS

ABSTRACT i

INTRODUCTION 1

ASSUMPTIONS AND APPROACH 1

RESULTS

1. Outline of Subject Areas and Training Modules 2

2. Questionnaire to Assess Training Needs 3

RECOMMENDATIONS 4

APPENDICES

1. Pest Management Strategies 5

2. Pest Detection and Identification 7

3. Surveys 8

4. Control Methods 10

5. Forest Service Pest Management Organization and Programs 11

6. Questionnaire to Assess Pest Management Training Needs 12

INTRODUCTION

Until very recently, most training in pest management for B.C. Forest Service staff was conducted by outside agencies such as the Canadian Forestry Service and by contractors such as Sylva Pest Management. Most of the training was either unspecified by the Forest Service or was developed by the outside agency that gave the training. In recent years, particularly since 1981, Forest Service requirements for pest management have expanded rapidly, especially with the urgent need to manage bark beetle infestations and other problems such as root diseases. Forest Service efforts have resulted in rapid development of pest management in B.C., so that previous basic and quite general training courses have become inadequate for current operations.

At a meeting of pest management staff in December 1984, at Victoria, several concerns were voiced about the need for improved pest management training in the Forest Service. A task force of J. Muir, Protection Branch, D. Gray, Nelson Forest Region, and P. Wood, Vancouver Forest Region, was appointed "to summarize problems, identify needs and solutions for Directors, Protection Branch, Personnel Services Branch". This report outlines the results and recommendations by the task force.

ASSUMPTIONS AND APPROACH

The task initially force decided that the best approach to its assignment would be to define and state the pest management training requirements that various staff would need to know in order to perform their pest management job functions. Forest Service staff then could be surveyed to determine: (1) if the requirements proposed by the task force were suitable; and (2) the specific training needs of staff in order to determine priorities for developing and presenting the training courses.

The task force assumed that the major emphasis for pest management training should be for operations mostly at District offices.

District staff would require training in specific methods such as: (1) to detect and categorize (approximately identify) pests and (or) pest damage; (2) to conduct aerial and ground surveys for significant pests in the District; (3) to select, prescribe, implement, monitor and assess treatments and (or) strategies to prevent or reduce pest damage; and (4) to develop and conduct a district-level pest management program including pest detection surveys, control strategies for major pests, damage appraisals, and selection of project or treatment areas.

The task force assumed that Regional and District administration staff would require training based on more general information on the above topics, including a demonstration of pest impacts, and an overview of Forest Service pest management policy and organization, to show how pest management responsibilities are shared and how goals are achieved in an integrated manner.

To satisfy these varied requirements, the task force assumed that short, quite specific course units or modules should be developed. To facilitate and provide direction for development of these training modules, the task force outlined several general examples (Appendices 1 to 5) including content, audience and objectives. The task force assumed that specifications for each training module will be outlined in more detail by Forest Service staff, and that the training packages will be developed by one or more contractors or consultants. However, a steering committee should be appointed to oversee the development of the modules and make recommendations for their approval by the Directors, Forest Protection,and Personnel Services Branches.

The task force also prepared a questionnaire (Appendix 6) to be circulated with the outline of modules to Forest Service staff in order to judge their suitability for training and the needs of staff for courses.

RESULTS

1. Outline of Subject Areas and Training Modules

The task force recognized several general subject areas for training:

(1) Pest management strategies,
(2) Pest detection and identification,
(3) Surveys,
(4) Prevention and control methods or treatments, and
(5) Forest Service organization and programs.

These areas are outlined in Appendix 1 to 5 (corresponding in numbers to the above areas).

For each subject area outlined, the task force envisioned that one or more specific modules would be developed, based on the needs of the District or audience. These requirements must be determined by further investigations. The results would be used by Forest Service staff to develop more detailed outlines, particularly including learning objectives, for development of specific training courses.

Each module should specify or include items such as:

- audience
- purpose
- learning and (or) performance objectives
- methods of evaluating the success of learning or performance
- visual and (or) training aids
- exercises and field trips to apply the knowledge.

The subject areas (Appendix 1 to 5) were categorized approximately according to these items.

2. Questionnaire to Assess Training Needs

To assist development of specific training modules, further information is required as to the Forest Service's needs and priorities. The task force developed a questionnaire (Appendix 6) for staff at Branch, Region and District offices. The questions included priorities and types of training, suitability of the proposed subject areas (Appendix 1 to 5) and priority for development of training modules.

RECOMMENDATIONS

Based on the review of training needs by the task force committee, and preparation of the subject area outlines and questionnaire in this report, the task force made the following recommendations.

1. A survey of Forest Service staff is needed to determine if the subject areas outlined here are suitable and what modules should be developed first. Estimated cost of a survey is $1500.00.

2. A pest management training steering committee should be appointed. Duties would include developing specifications for the survey (item 1), and coordinating development of specific training modules.

   Estimated costs for travel and accommodation are $6000.00 per year (3 meetings x 4 personnel x $500 for 2 days).

3. On the basis of casual inquiries, development of identification training modules for District staff, to consist of workshops of not more than 1 to 2 days each, appears fmost urgent.

   Development of each identification module is estimated roughly at $2000.00 each. For an estimated 15 major pathogens and diseases and 16 insects, the approximate total is $62,000. However, only 10 to 12 would be needed initially, at an estimated cost of $24,000.

   Development of modules on pest management strategies (Appendix 1), and Forest Service organization (Appendix 5) are estimated at $7,000 (total).

   Survey modules are estimated roughly at $3,000 each. For 4 or 5 modules, the total cost would be $12,000 - $15,000.

   From 4 to 5 control modules also are needed. At a rough estimate of $3000 each, the total cost would be $12,000 - $15,000.

   In total, the estimated costs for development of modules would be $55,000 to $61,000 initially, with additional future expenditures of 2 to 3 times that amount to develop the most important modules.

4. The task force recognized that the Advanced Forest Pest Management course developed by Sylva Pest Management in 1980 was adequate for special needs at that time. However , because of the rapid development of pest management within B.C., the course now is not suitable for current Forest Service training requirements.

5. Future pest management courses including those developed or presented by other agencies must be reviewed and approved by the Director, Forest Protection Branch, before such courses are used for training by Forest Service staff.

APPENDIX 1. Pest Management Strategies

Audience: District field staff, administration and Regional staff.

Purpose:

To present essential background information for survey and control modules. To facilitate development of District pest management 5-year plan.

General Learning Objectives:

- How to and why control pests.
- Outline framework and objectives of District pest management program:
  - essential elements
  - basic questions (see below) to be answered
  - necessary data and methods.

Content:

1. Determine likely pests in the District.
2. Determine current pest occurrences.
3. Determine which pest occurrences will result in significant damage now or in the future.

   Considerations:

   - net operable land base
   - volume or growth of timber
   - loss expected from damage, e.g., mortality, growth reduction
   - expected trends in damage for next year(s)
   - immature or mature timber
   - risk of spread
   - appraised damage in context of short and long term timber supplies
   - non-timber values
4. Determine if there is anything practical that can be done

   - possible control options (policy, directives, guidelines)
   - constraints including technical, social, environmental, economic, political, temporal, seasonal logistical, legislative or regulative
   - expertise, budgets, training, supplies
   - "net feasible options"

5. Determine treatments for specific infestations per pest for the year.

   - select treatment - area combinations based on access, levels or intensity of infestations, feasible options and constraints. For example, a 80 ha. stump pulling for Phellinus weirii control, a 400 ha. sanitation harvesting for mountain pine beetle control, etc.

6. Repeat steps 3 to 5 above for each pest, then select or set priorities for all infestations based on estimated maximum net benefit for program money available.

7. Implement and monitor control operations.

   - training
   - permits for pesticide application
   - contracts

8. Assess control operations.

9. Record results and information.

APPENDIX 2. Pest Detection and Identification

Audience: District field staff

Purpose of the module:

Information and procedures for detection and identification of major pests in the District. (Modules to be developed for each major pest or pest group.)

Learning Objectives and/or content:

- recognize pest damage features
- recognize and identify major pest to species
- distinguish between major pest and similar or associated pests or other organisms
- recognize major pest groups
- recognize other injuries, disorders, abnormalities of trees.

Content:

A. Provide for each pest (in the District):

- fresh specimen
- photographic slides or other illustrations
- field demonstration of damage and features (if practical)
- tabulated or key features to identify damage, pest group, major pest
- comparison and contrast with similar or associated organisms, pests and damage
- references, descriptions, pest leaflets
- geographic distribution, host tree species, site features
  (Note: information and illustrations ideally should be provided in field notebook-format similar to ecological manuals)
- types (general and specific) of pest damage and effects
- collection procedures for specimens to be identified
- life stages and features per major pest (e.g., larvae, eggs, mushrooms, mycelium)

B. Develop a list of major pests and damage.

APPENDIX 3. Surveys

Audience: District field staff

Purpose of module:

Present detailed procedures for surveys of specific pests. Develop a separate module for each survey.

Learning Objectives:

Able to perform specified survey to stated standards.

Content: (Partial list only; develop for each pest)

A. Introduction

- refer to Appendix 1. for general background
- principles: determine needed detail only
  - clarify objectives
  - systematic, pro-active, regular
  - standardized
  - integrated with usual surveys and entries
  - timing per pest and host
  - significant pests only
  - based on pest biology, sampling, statistics
  - Ministry policy and procedures

B. Pest-Specific Surveys

- for major each pest, present one or more individual methods for surveys. Each survey to be one module. Tabulate methods for comparison.
- develop methods in a field notebook format
- present each survey in detail: how to do the survey, record data, etc.
- develop separate sections for pest surveys to be inserted in silviculture surveys and assessments, timber cruising, inventory, etc.
- methodology for pre-harvest silviculture prescription should be emphasized
- include aerial and ground surveys
- TSA-level, cutblocks, etc. require different level of surveys
- outline purpose of each survey, e.g.,. general assessment of occurrence, TSA-wide overview to set priorities, operation-specific surveys to develop treatments
- describe where not to survey?

C. Examples of surveys per pest

a. Mountain pine beetle
- annual overview aerial
- site-specific (operational) aerial
  - photography
  - sketch mapping
- ground probe for
  - harvest
  - cut and burn
- overwintering survival assessment
- assessment of pheromone containment

b. Laminated root rot Phellinus (ground surveys)
- TSA-TFL overview, impact-assessment (ground)
- pre-harvest silvicultural prescription
- reconnaissance survey (for stands younger than rotation age)
- treatment area layout
- pre-spacing
- free-to-grow

c. Defoliating insect
- aerial overview
- egg count survey
- larval count survey
- aerial site-specific survey
- assessment of control efficacy

APPENDIX 4. Control Methods

Audience: District field staff

Purpose:

To provide background and methods to control pests in District. Develop specific module per major pest or pest group.

Learning Objective:

- determine and implement most appropriate control treatment (including "do nothing") for each infestation or operation.

Contents (Partial List):

A. Introduction
   - use Appendix 1 for overall Pest Management Strategies and tie-in with surveys in Appendix B.

B. Principles
   - generally, control during (at) forestry operations
   - constraints (limitations) per method
   - most appropriate (vs. most effective) method for the forestry operation, resource and (or) use constraints
   - thresholds for control, e.g., 10% root rot
   - cost benefit analyses
   - best returns for expenditures
   - most susceptible phase of pest life stage
   - prevention vs. suppression

C. Approaches
   - eradication
   - delay infestation
   - suppression
   - prevention

D. Tabulate methods per pest with objective(s) and limitations per method

E. Provide step-by-step procedures for each method on field notebook-sized pages to be most useful.

F. Include field inspections, prescriptions and trips to demonstration areas.

APPENDIX 5. Forest Service Pest Management Organization and Programs

Audience:

District Managers, Operations Superintendents, Regional Program Managers

Objectives:

- Show how to integrate and effectively use Forest Service staff and operations to achieve pest management objectives.
- Outline roles and responsibilities for pest management within the Forest Service.

Contents (partial list):

- pest management administration policy with responsibilities
- data and information to demonstrate pest significance and relative importance
- why certain pests should be controlled (or why not)
- District, Region and Branch 5-year pest management plan
- an example (possibly hypothetical) of a well-integrated unit or District
- "tricks of the trade" to achieve integration
- possible workshop format to compare problems and successes of several Districts
- methods or outline of procedures that ensure integrated approaches for activities or programs such as:
  - pre-harvest silviculture prescription
  - silviculture surveys
  - harvesting plans
  - inventory depletion
  - protection

APPENDIX 6. Questionnaire to Assess Pest Management Training Needs

The task force recommended that the needs for training in pest management should be determined by surveying a wide selection of Forest Service personnel at Branch, Region and District offices. The task force recommended that the modules outlined here and the following questions should be distributed.

1. Whom do you perceive as needing pest management training? (List positions in order of priority for training from greatest to least).

_____

_____

_____

2. What training is required?

_____

_____

_____

3. Attached is a proposed outline of subject areas and/or modules for pest management training courses. Would these areas or modules satisfy the requirements you have listed (#2 above)?

Yes _____

No _____

Yes, with the following changes _____

_____

_____

4. What subject areas or module(s) would you give the highest priority for training in your District/Region?

_____

5. What pests would you give the highest priority for your District/Region?

_____

_____

_____

6. Comments? _____

_____

_____