

# Effects of Operational Brushing on Conifers and Plant Communities in the Southern Interior of British Columbia

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## Results from PROBE 1991–2000 PRotocol for Operational Brushing Evaluations

2001



Ministry of Forests  
Research Program

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Protocol for Operational Brushing  
Evaluations

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This Land Management Handbook contains a large amount of information on the effects of operational brushing treatments on conifers and plant communities in the Kamloops and Nelson forest regions. Data were collected over a 9-year period from 96 individual PROBE (PROtocol for Operational Brushing Evaluations) trials, and detailed parametric statistical analysis has now been carried out for eight different vegetation complexes. We have organized this document primarily by vegetation complex, so that information for each of the eight complexes is presented in individual sections that essentially “stand-alone.” Each of these sections contains an abstract, an introduction, site descriptions, results, a discussion, conclusions, and management implications (Sections 4–11).<sup>\*</sup> The overall introduction, objectives, and methodology are contained in Sections 1–3, and an overall summary and management recommendation are presented in Section 12. Readers are referred to the overall summary and section abstracts for a quick synopsis of the study results. We could not include all PROBE sites in the analysis because not all combinations of “vegetation complex–brushing treatment–biogeoclimatic unit–conifer species” have been adequately replicated. Results from unreplicated treatments are summarized in the Appendices.

Here is a brief description of the contents of each section of this report:

**Section 1—Introduction:** A description of the overall approach and scope of the PROBE program, as well as its relevance to silvicultural treatment effectiveness measurement and monitoring in British Columbia.

**Section 2—Objectives:** Specific objectives of the PROBE program.

**Section 3—Methods:** A description of the experimental design, methods of data collection, and methods of data analysis.

**Section 4—Fireweed Complex:**

Manual brushing to release Engelmann spruce in the ESSF/ICH zones

Manual brushing to release lodgepole pine in the ICH/ESSF zones

Foliar glyphosate application to release Engelmann spruce in the ESSF/ICH zones

Grazing treatments to release Engelmann spruce in the ESSF zone

**Section 5—Fern Complex:**

Foliar glyphosate application to release hybrid spruce in the ICH zone

**Section 6—Mixed Shrub Complex:**

Manual brushing to release hybrid spruce in the ICH/ESSF zones

Grazing treatments to release hybrid spruce in the ICH/ESSF zones

**Section 7—Ericaceous Shrub and Subalpine Herb Complexes:**

Manual brushing of the *Ericaceous Shrub* Complex to release Engelmann spruce in the ESSF zone

**Section 8—Dry Alder Complex:**

Manual brushing to release lodgepole pine in the MS zone

**Section 9—Wet Alder Complex:**

Manual brushing to release Engelmann spruce in the ESSF zone

**Section 10—Aspen Complex:**

Manual brushing to release lodgepole pine in the IDF/MS zones

**Section 11—Mixed Broadleaf-Shrub Complex:**

Manual brushing to release Douglas-fir in the ICH/IDF zones

Manual brushing to release lodgepole pine in the ICH zone

Cut stump–glyphosate treatment to release Douglas-fir in the ICH zone

Girdling to release Douglas-fir in the ICH zone

**Section 12—Overall summary:** An overall summary of PROBE findings and their implications for forest management in the southern interior of British Columbia.

**Section 13—References:** A list of all published and unpublished cited material.

**Appendix 1—**Information about the *Willow* and *Pinegrass* Complexes and a summary of results for unreplicated treatments involving these communities.

**Appendix 2—**Summary tables containing information about PROBE sites that presently represent unreplicated treatment cells.

<sup>\*</sup> This organization allows readers to refer only to the vegetation complex that they are interested in.

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This report is the co-operative work of five authors who together designed the layout of the report. Jean Heineman is the principal author of the following sections: *Fireweed Complex*, *Ericaceous Shrub* and *Subalpine Herb Complexes*, *Wet Alder Complex*, *Pinegrass Complex*, and *Willow Complex* sections. She also assisted with the Introduction and Methods sections. Jean Mather is the principal author of the *Fern Complex*, *Mixed Shrub Complex*, *Dry Alder Complex*, *Aspen Complex*, and *Mixed Broadleaf-Shrub Complex* sections. Suzanne Simard authored the Competition Thresholds sections, Overall Summary, co-authored the Introduction and Methods sections, and edited several drafts of the full report. Jean Heineman assumed the difficult task of putting all of the separate sections into a standard format. Don Sachs was responsible for all aspects of data analysis. This included database management, statistical consultation, SAS program development, graphics, and statistical interpretation. Alan Vyse has been involved with the project since its initiation, and has assisted with design and interpretation, extension, advancement, and funding acquisition. He also provided considerable input to the *Ericaceous Shrub* section and the Overall Summary.

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wrote an addendum to the protocol to clarify and expand on data-collection and reporting methods.

Since the onset, Suzanne Simard has managed the PROBE program, including all aspects of design, delivery, extension, advancement, and funding acquisition. Barbara Zimonick has assisted with administration of the PROBE program, and Jean Mather has co-ordinated field crews and assisted with management of the sampling matrix. Jean Mather was the principal author of PROBE memos, which pre-dated this report.

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