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**Canadian  
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forêts**

**Canada**

# **STUDY STATEMENTS 1983-84**

**Northern Forest Research Centre**

**Canadian Forestry Service**

**Edmonton, Alberta**



STUDY STATEMENTS

1983-84

NORTHERN FOREST RESEARCH CENTRE

CANADIAN FORESTRY SERVICE

APRIL 1983

## CANADIAN FORESTRY SERVICE

## STUDY STATEMENT

1983 - 84

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Responsibility Centre: NORTHERN FOREST RESEARCH CENTRE

Date: December 15, 1982

1. Project: Fire management systems and guidelines
2. Title: Fire retardant and airtanker evaluations and application
3. New: Cont.: X
4. No.: NOR-5-037
5. Study Leader: R.G. Newstead
6. Key Words: Airtankers, helitankers, retardants, aerial suppression, airtanker accuracy, effectiveness, drop patterns, static testing, tank and gating systems, simulation models, wildfires.
7. Location of Work: Throughout region
8. Study Objectives:
  1. To measure and evaluate the drop characteristics of various airtanker/fire retardant combinations, including helitankers.
  2. To evaluate fire retardants and determine the optimum application required to slow and/or stop fires burning in different fuels under varying burning conditions.
  3. To observe and evaluate the effectiveness of airtankers and helitankers and other fireline construction resources during fire suppression operations.
  4. To evaluate new retardant mixing systems and their role on wild-fire operations.
  5. To analyze and disseminate information concerning resource use optimization to fire management agencies through technical assistance, consultation, and training.
9. Goals for 1982-83:
  1. Continue on-site evaluation of retardant/airtanker effectiveness in wildfire control.

2. Investigate and promote modifications of fixed-wing tank and gating systems and helicopter tank and bucket systems. Develop new drop grid system to facilitate testing of new/modified airtanker and helitanker delivery systems.
  3. Test and calibrate a prototype retardant application system and combustion table for use under controlled laboratory conditions.
  4. Provide technical assistance, training and technology transfer to regional, national and international fire control agencies and industrial organizations as requested.
10. Accomplishments in 1982-83:
1. In co-operation with the Alberta Forest Service spent two weeks in the Slave Lake and Edson Forests evaluating the performance and effectiveness of air tankers and retardants in their initial attack roles on wildfires. Information was compiled on six fires and an interim report on findings was presented to A.F.S. bird-dog and air attack officers at their annual review meeting.
  2. Provided technical assistance to S.E.I. Industries and Okanagan Helicopters in the development of a prototype vinyl heli-bucket. This revolutionary bucket design and construction was operationally tested in Alberta during the 1982 fire season, and was demonstrated to interested fire control agencies on several occasions. Participated in helitanker delivery system discussions at a helicopter management workshop in Kelowna, B.C. and during drop trials in Missoula Montana. Constructed a new 1000 container drop grid system.
  3. There were no further accomplishments in the testing and calibration of the laboratory retardant application system and combustion table owing to delays in construction and installation of a retardant release valve and burning table output amplifier. Resignation of Research Technician R. Lieskovsky contributed to these delays.
  4. Provided technical assistance, training, and technology transfer to regional, national, and international fire control agencies and industries as follows:
    - a) Advised Canadair Ltd. in the development of an on-board injection system for use with liquified water thickening compounds.
    - b) Conducted laboratory evaluation of a liquified water thickening compound, Fire-Kill, at the combined request of Canadair Ltd. and Sanitek Inc. of Los Angeles, the product manufacturer.


- c) Provided technical guidance to Saskatchewan Dept. Tourism and Renewable Resources Fire Control Branch on the comparative performance of water skimming air tankers and helitankers being considered for future fire control operations in Saskatchewan. Similarly advised A.F.S. and B.C.F.S. on the relative effectiveness of water and long term retardants in consideration of future air attack requirements.
- d) Conducted laboratory evaluations of separation and settling characteristics of gum thickened liquid concentrate fire retardant (Fire-Trol 931) mixtures, simulating storage on board air tankers.
- e) Participated in a retardant development workshop at Kamloops, B.C. sponsored by Chemonics Industries Ltd. in conjunction with the introduction and demonstration of a new gum-thickened sulphate (G.T.S.) retardant product.

11. Goals for 1983-84:

1. Provide technical assistance, training and technology transfer on matters pertaining to aerial fire control technology including fire retardants and delivery systems to regional, national, and international fire control agencies and industrial organizations as requested.
2. In co-operation with the Alberta Forest Service, continue on-site evaluation of retardant/air tanker effectiveness with emphasis on factors affecting retardant performance at the fire's edge. Results to date to be prepared for submission as a Forestry Report article.
3. Direct the testing and calibration of a prototype retardant application system and combustion table for use under controlled laboratory conditions.
4. Review and assess the role and usefulness of foaming and wetting agents in forest fire control. Report findings to date.

12. Signatures:

  
Investigator

  
Program Manager

Director A.D. Kill

## CANADIAN FORESTRY SERVICE

## STUDY STATEMENT

1983 - 84

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Responsibility Centre: NORTHERN FOREST RESEARCH CENTRE

Date: December 15, 1982

1. Project: Fire management systems and guidelines
2. Title: Fire behaviour in boreal forest fuels
3. New:      Cont.: X
4. No.: NOR-5-086
5. Study Leader: Z. Chrosciewicz
6. Key Words: Canadian Forest Fire Weather Index, fire behaviour, fire effects, danger rating.
7. Location of Work: Various areas within the western and northern region.
8. Study Objectives:
  1. To develop fire spread and intensity tables for major fuel complexes.
  2. To assess fire effects in terms of fuel reduction and plant succession over a range of burning conditions.
  3. To establish guidelines for rational uses of fire in manipulation of various fuel combinations.
  4. To assist fire control agencies in application of the resulting tables and guidelines.
9. Goals for 1982-83:
  1. Publish "Forest ecosystems and fire hazard in central Saskatchewan" (Forestry Report). [See Study NOR-5-174 Goal]
  2. Publish "Failures and successes in jack pine regeneration following postcut burning and seeding treatments in southeastern Manitoba (Information Report).
  3. Publish "Jack pine and other forest regeneration following postcut burning and seeding treatments in central Saskatchewan (Information Report).

4. Publish "Foliar moisture variations in jack pine, black spruce, white spruce, and balsam fir, central Alberta" (Canadian Journal of Forest Research).
5. Publish "Foliar calorific variations in jack pine, black spruce, white spruce, and balsam fir, central Alberta" (Canadian Journal of Forest Research).
6. Complete preparation of text for the second chapter in the proposed international monograph on white spruce regeneration. Submit both chapters for publication.
7. Continue data analysis on dimensionally categorized biomass of six major understory shrub species in central Alberta.
8. Continue data analysis on relationships between fuels, fire behaviour and weather for semimature jack pine stands in central Alberta.
9. Analyse data on relationships between standard moisture codes (CFWI-System) and sampled moisture contents of dimensionally categorized aerial and ground fuels on jack pine clear-cuts in central Saskatchewan.
10. Continue with technology transfer as required.

Goals Added:

11. Continuation of chemical foliar analyses for major conifers in central Alberta.

10. Accomplishments in 1982-83:

1. The write-up, reviews and editorial work on "Forest ecosystems and fire hazard in central Saskatchewan" were completed, and the paper is now ready for publication.
2. The write-up, reviews and editorial work on "Failures and successes in jack pine regeneration following postcut burning and seeding treatments in southeastern Manitoba" were completed, and the paper should be ready for publication early in 1983.
3. The write-up, reviews and editorial work on "Jack pine and other forest regeneration following postcut burning and seeding treatments in central Saskatchewan" were completed, and the paper should be ready for publication early in 1983.
4. The preparation of paper on "Foliar moisture variations in jack pine, black spruce, white spruce and balsam fir, central Alberta" is nearing completion, and the manuscript will be available for review early in 1983.


5. All relevant combustion data were converted to joules, and the paper on "Foliar calorific variations in jack pine, black spruce, and balsam fir, central Alberta" will be completed and available for review early in 1983.
6. Contribution of several authors involved was much less than expected and the publication of the proposed international monograph on white spruce regeneration was indefinitely postponed until further deliberations in mid-1983. Completion of the second chapter mentioned depends to a degree on cooperation by some of the outside authors.
7. All computer work re.categorized biomass of six major understory shrub species in central Alberta was completed as planned.
8. A substantial progress was made in the analysis of data on relationships between fuels, fire behavior and weather for semimature jack pine stands in central Alberta.
9. Numerous regressions were computed for the relationships between standard moisture codes (CFWI-System) and sampled moisture contents of dimensionally categorized aerial and ground fuels on jack pine clear-cuts in central Saskatchewan.
10. When requested, routinely information was provided to interested individuals and user agencies.
11. Sugar and starch contents were determined in some 180 foliar samples from major conifers in central Alberta.

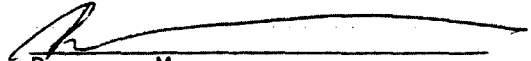
Goals for 1983-84:

1. Publish "Failures and successes in jack pine regeneration following postcut burning and seeding in southeastern Manitoba" (Information Report).
2. Publish "Jack pine regeneration following postcut burning and seeding in central Saskatchewan" (Information Report).
3. Publish "Foliar moisture variations in jack pine, black spruce, white spruce and balsam fir, central Alberta" (Canadian Journal of Forest Research).
4. Publish "Foliar calorific variations in jack pine, black spruce, white spruce, and balsam fir, central Alberta" (Canadian Journal of Forest Research).
5. Continue data analysis on relationships between fuels, fire behavior and weather for semimature jack pine stands in central Alberta.
6. Publish "Forest ecosystems and fire hazard in central Saskatchewan" (Forestry Report).



12. Signatures:

  
Investigator

  
Program Manager

Director A.D. Kii

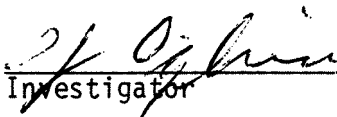



3. Compile and analyze LLP system data and fire occurrence data using NoFRC computer and data base management systems to develop an effective method for lightning fire prediction.
  4. Publish FMN report on "Construction and use of portable fire finder".
  5. Provide liaison, technical services and training to client agencies.
10. Accomplishments in 1982-83:
1. The scan extender is now M.O.T. approved for use from Prince Albert Air's Navaho. Flights were made to test the 7<sup>0</sup>, 12<sup>0</sup> and 20<sup>0</sup> lenses for the Thermovision. The 12<sup>0</sup> lens provides the most workable combination of sensitivity and coverage and was chosen for operations. Using the Navaho searches, can now be conducted at 200 mph and 10,000 ft. which results in scanning 800 sq. miles per hour.
  2. Have received information on 3 new handheld scanners; two of these, the Xedas and Lentech machines are pyroelectric videocons that need no external cooling and the third from Inframetrics uses a detector medium and is cooled by liquid N<sub>2</sub>. In addition a test flight was made using an AGA 782 machine in the scan extender.
  3. By accompanying an initial attack crew working out of La Ronge 5 lightning fires were visited to gather data to be used for supporting the lightning fire prediction model. Data such as holdover time, burning characteristics (spread rate pattern), and moisture contents and bulk densities of fuels at the point of ignition will be combined with weather indices to quantify the parameters affecting the ignition and smouldering process.
  4. The Forest Management Note on the NoFRC Fire Finder is in review.
  5. Provided liaison and technical services to client agencies as follows:
    - a) Provided information on and loaned the scan extender to Ellis Hancock of the Newfoundland Forest Service.
    - b) Drew profiles and completed field work in preparation for constructing seen area maps for 11 towers in R.M.N.P. and one tower in Sask.
    - c) Supplied 6 NoFRC Fire Finders constructed by P. Bihuniak to Sask. DTRR.
    - d) Supplied plans for Fire Finder to Yukon Forest Service and Cape Breton Highlands National Park, Nova Scotia.

11. Goals for 1983-84:

1. Publish FMN report on "Construction and use of NoFRC portable fire finder". Terminate.
2. Test and calibrate a prototype retardant application system and combustion table for use under controlled laboratory conditions.
3. Collect lightning fire origin data to be used for supporting the lightning fire prediction model. Data, including holdover time, burning characteristics, and moisture contents and bulk densities of fuels at the point of ignition will be combined with weather indices to quantify the parameters affecting the ignition and smouldering process.
4. Provide seen area maps for eleven detection towers in Riding Mountain National Park.
5. Prepare file report on currently available infrared systems; operational procedures availability, sensitivity, accuracy and costs.
6. Refine operational use of AGA infrared system and LLP system in Saskatchewan.
7. Compile fire weather and fire report data for calibration and performance of CFWI in Sask.
8. Provide technical services and training to client agencies.

12. Signatures:

  
Investigator

  
Program Manager

Director

A.D. Kill



10. Accomplishments in 1982-83:

1. No progress made. This goal will be advanced to 1984-85.
2. No progress made.
3. This study should continue to facilitate CFS/Parks Canada cooperative efforts, including completion of the Nahanni and Wood Buffalo studies. a proposed fuel description for Jasper National Park, prescribed burning in Elk Island National Park and Prince Albert National Park, technology transfer and advisory services to all levels of park administration [park. regional. national]. A summary of fire related activities with Parks Canada in 1982 follows.

JAN.: Reviewed fire research activities with Parks/C.W.S./C.F.S.

FEB.: Met with Prairie Region/Parks Canada to discuss resource management planning in Nahanni National Park.

APR.: Met with E.I.N.P. personnel to discuss plans for spring burning program.

MAY: Collected research information before, during and after prescribed burn in E.I.N.P.

JULY: Met in Jasper to confirm Jasper fuel description study.

AUG.: Met with University of New Brunswick faculty to discuss fire research proposal submitted by U.N.B. to Parks Canada.

OCT.: Made a presentation at the Intermountain Fire Council, Jackson, Wyoming. reviewing fire management activities in Canada's National Parks.

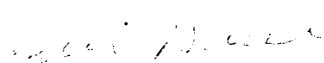
DEC.: Attended (Delisle) annual CFS/Parks meeting.

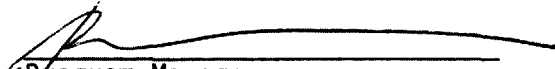
11. Goals for 1983-84:

1. Complete and submit fire management studies for Nahanni [Mar. 31] and Wood Buffalo [Nov. 30] National Parks. [Dubé].
2. Prepare a study plan by Feb. 1/83 presently titled "Forest Fuels and Fire Potential in Jasper National Park". This is a M.Sc. project conducted by G. Delisle.
3. Conduct fieldwork. in the summer of 1983. on forest fuels in Jasper National Park. [Delisle].

4. Provide advisory services to National Parks with emphasis on fire management guidelines [Dubé].
5. Collect research data in support of prescribed burning in Elk Island National Park [Delisle, Dubé].

11. Signatures:

  
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Investigator

  
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Program Manager

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Director                      A. D. Kii1





5. Prepare file report on NoFRC data on hand towards developing a regional fire data library. (Alexander & Dubé)
6. Complete analysis and reports on a) Pukaskwa National Park fire history and ecology, b) on experimental fires and wildfires associated with GLFRC studies. (Alexander)
7. Initiage study to assess economic impact of fire in relation to fire management objectives and priority-zone considerations. (Dubé)
8. Continue to provide technology transfer, participation on committees, task forces and review boards aimed at improving the protection and use of Canada's forests through efficient fire mangement. (All)
9. Publish Fire History Atlas for Alberta. (Delisle)
10. Publish Forestry Report. (Dubé)
11. Publish Information Report on spring burns in a 50 year old aspen stand. (Alexander)

Added Goal:

12. Present paper at I.F.C. meeting, Salt Lake City, Utah. (Newstead)

10. Accomplishments in 1982-83:

1. An initial draft of an information report on the development and application of the NoFRC initial-attack planning model is in the final stages of preparation. A review draft is expected to be in circulation early in 1983. (Newstead)
2. The resignation of Research Technician R. Lieskovsky (co-author) has delayed preparation of the initial draft of an Information Report on the status of accumulated NoFRC retardant/airtanker drop test results. A review draft is expected to be in circulation early in 1983. (Newstead)
3. A contract was let to develop a prototype location-allocation model suitable for application to forest fire suppression problems involving multiple resource allocation alternatives. The contract report on file provides two generalized solution techniques programmed for the TI-59 calculator. However, these algorithms, in conjunction with the limited capacity of the TI-59 calculator, are not likely to offer the scope to handle the multitude of resource and fire occurrence variables and alternatives encountered in pre-attack planning. (Newstead)
4. Correlation analyses of the results of the A.F.S. aerial observer data compiled to date showed that weak relationships exist between most variables. Coupled with the poor quality and paucity of data

collected, these results indicate further statistical analysis is not warranted. Interim "manual" interpretation of these data and summary reports have been prepared and have proved beneficial to the A.F.S. (Newstead)

5. Not completed due to other duties. Some related progress made:
  - (a) D.L. Martell's PBWX computer program (fire weather prescription testing/frequency analysis) placed on NoFRC's PDP-11 and
  - (b) metric conversion and transcribing of historical fire weather record forms (1940-69) for Riding Mtn., Prince Albert, Waterton Lakes, Banff, and Jasper National Parks completed and ready for keypunching. Responsibilities for regional fire data library to be transferred to incumbent Fire Operations Research Officer. (Alexander and Dubé)
6. Not completed in its entirety. Spent one week at GLFRC on Pukaskwa fire history study. Undertook preliminary analysis of data collected on permanent regeneration plots on wildfire sites in NW Ontario. (Alexander)
7. No progress towards this goal has been achieved and it will be deleted from further consideration owing to ongoing research at PNFI, alternate regional research priorities, and work load. (Dubé)
8. Provided technology transfer, instructional training and participation in workshops, meetings and committees as follows:
  - a) Attended Canadian Committee on Forest Fire Control Annual Meeting and participated in a poster session to demonstrate the NoFRC initial-attack planning model. (Newstead)
  - b) Provided instructional training at several A.F.S. in-service courses at the Forest Technology School (Hinton) including the sector and division level courses and the helicopter management course. (Newstead)
  - c) Attended Intermountain Fire Council Annual and Organizational meetings as a steering committee representative to discuss organizational requirements and theme options for the 1983 meeting to be held in Banff. (Newstead)
  - d) Attended the annual A.F.S. forest protection officers meeting and presented a progress summary of the fire management systems project activities. (Newstead)
  - e) Reviewed three internal (NoFRC) and two external (U.S.F.S. and A.F.S.) draft manuscripts. (Newstead)
  - f) Reviewed one manuscript at the request of the Can. J. For. Res. editor. (Alexander)

- g) First draft of annotated bibliography, CFS fire research publication in the W&N Region (1962-82) placed on word processor. (Alexander and Dubé)
  - h) Participated in updating CFS position paper on Mountain Pine Beetle. (Dubé and Alexander)
  - i) Assisted in selection of head of fire control for N.W.T. (Dubé)
  - j) Discussed fire research program with two school groups and students from technical college at Ft. Smith on three separate occasions. (Dubé)
  - k) Presented an overview of the Mountain Pine Beetle program to the Environment Council of Alberta. (Dubé)
  - l) Attended the Environmental Nongovernmental Organization (ENGO) meeting in Calgary, representing NoFRC.
  - m) Attended three "fire management program committee" meetings in Yellowknife, N.W.T. (Dubé)
  - n) Discussed fire research project with a delegation from the Peoples Republic of China. (Dubé, Alexander, Newstead)
  - o) Appointed committee member to review and evaluate the "Water Quality and Reclamation Technology Program" at Lakeland College, Vermilion. (Dubé)
  - p) Served as Acting Program Manager for three weeks in October/82 and performed other administrative functions associated with the Project Leader responsibilities. (Dubé)
  - q) Attended the program review of the fire research section at P.F.R.C. (Dubé)
9. The fire history atlas for Alberta has been completed and is ready for review. (Delisle)
  10. Forestry report is nearing completion and a draft is currently in review. (Dubé)
  11. No further progress since last review. Goal being transferred to NOR-5-191 for completion in FY 83-84. (Alexander)

Added Accomplishment:

12. Published: Newstead, R.G. & M.W. Potter. 1981. An initial attack planning model. In Proceedings, Intermountain Fire Council Computer Modeling: Its Application in Fire Management. (J.E. Lotan, Editor.)


11. Goals for 1983-84:

1. Publish Forestry Report. Terminate. (Dubé)
2. Complete analysis and reports on (a) Pukaskwa National Park fire history and ecology by Mar. 31/83, and (b) experimental fires and wildfires associated with GLFRC studies. (Alexander)
3. Publish an Information Report on the status of all airtanker/retardant drop pattern data compiled and analyzed to date. (Newstead)
4. Assist in the organization of and prepare for publication of the Proceedings of the 1983 Intermountain Fire Council. (All)
5. Publish: Hodgson, M.J. and R.G. Newstead. 1983. Location-allocation models for control of forest fires by air-tankers. Can. Geog. Vol. XXVII No. 2. (Newstead)
6. Publish an Information Report on the development and application of the initial-attack planning model, incorporating fire-line productivity, rate-of-spread, fuels, and other related information. (Newstead)
7. Publish fire atlas for Alberta. (Delisle)
8. Continue to provide technology transfer, participation on committees, task forces and review boards aimed at improving the protection and use of Canada's forests through efficient fire management. (All)
9. Supervise and coordinate the regional fire research program. (Dubé)
10. Initiate a mission-oriented problem analysis in operations research for forest fire management. (O.R.)
11. Initiate a regional fire data library, including information from fire reports, daily fire weather records and fire statistics. (O.R.)

12. Signatures:



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 Investigator





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 Investigator



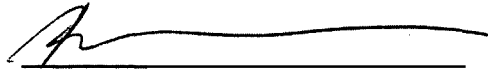

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 Investigator




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 Investigator




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 Program Manager

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 Director A.D. Kiiil

## CANADIAN FORESTRY SERVICE

## STUDY STATEMENT

1983 - 84

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Responsibility Centre: NORTHERN FOREST RESEARCH CENTRE

Date: December 15, 1982

1. Project: Fire management systems and guidelines
2. Title: Fire danger and behavior rating in forest and rangeland environments
3. New:        Cont.: X
4. No.: NOR-5-191
5. Study Leader: M. E. Alexander
6. Key Words: Canadian Forest Fire Danger Rating System, wildfire case histories and studies, fire behavior estimation, fire environment.
7. Location of Work: Regional
8. Study Objectives:
  1. To develop, evaluate, interpret and apply the Canadian Forest Fire Danger Rating System.
  2. To improve the assessment and prediction of wildfire behavior in terms and by methods which are useful to fire management agencies.
9. Goals for 1982-83:
  1. Prepare FMN on descriptive danger index classes associated with the new Sun-exposed Fine Fuel Moisture Code (SFFMC) and Fast-Drying Spread Index.
  2. Prepare FMN on relationship between SFFMC and Cladonia Fire Hazard Index.
  3. Participate in cooperative projects on CFS National Fire Danger Working Group, including continued development of the Fire Behavior Index subsystem.
  4. Initiate field reconnaissance and prepare study plan on adaptation of CFFDRS to the distinctive weather and fuel conditions in the NWT.

5. Provide advice and services as required, including serving on Central and Western Regional Fire Weather Committees.
6. Compile and analyze data for selected past wildfires.
7. Monitor and document on-site fire behavior of selected fires.
8. Prepare FMN on use of hand-held wind gauges on forest and range-land fires.
9. Review unpublished experimental fire behavior data on file at NoFRC and summarize.

Goals added:

10. Revise the former CFFBS Fine Fuel Moisture Code diurnal adjustment table supplement.
11. Prepare an annotated bibliography on the Canadian Forest Fire Danger Rating System.
12. Prepare a journal note on fire behavior in aspen slash fuels as related to the Canadian Fire Weather Index.

10. Accomplishments for 1982-83:

1. Provided interim descriptive danger index classes (Low, Moderate, etc.) associated with the proposed Fast-Drying Spread Index (FDSI) and a fire danger climatology for the new Sun-exposed Fine Fuel Moisture Code (SFFMC) to all user agencies in the W & N Region. Arranged for field trials of the FDSI and SFFMC during the 1982 fire season (e.g., tables, instructions, computer program). Final preparation of publication placed in abeyance pending finalization of SFFMC and FDSI equations by PNF. Correspondence documenting work to date on file.
2. Fire weather data and Cladonia Fire Hazard Index (CFHI) values acquired for Lambert Creek Lookout in northeastern Alberta (1972-1982). Computer calculated values of the SFFMC and Fine Fuel Moisture Code (FFMC) determined. Provided Alberta Forest Service with an interim relationship between the CFHI and (a) the SFFMC and (b) the FFMC (correspondence on file). Final preparation of originally intended publication placed in abeyance pending finalization of SFFMC and FDSI equations by PNF.
3. A national fire behavior data base by fuel type (experimental fires and selected wildfires from Canada and U.S.) was assembled during two working group meetings in 1982. Preliminary fire spread equations and graphs have now been produced from this data during two working group meetings in 1981.

bank. A proposal<sup>1</sup> outlining the future development of the Fire Behavior Indices subsystem of the CFFDRS was prepared for distribution and comment by user agencies.

4. Objective altered to accommodate request by Dept. of Indian and Northern Affairs to participate in a short-term (10 days) experimental burning project in the black spruce-lichen woodland fuel complex at Porter Lake, Caribou Range, N.W.T. Coordinated CFS efforts involving fire research staff from PFRC, GLFRC, PNFI, and NoFRC (study leader on site June 28-July 10). Other permanent NoFRC staff participating in project include: D.E. Dubé, G.P. Delisle, P. Golec, M.E. Maffey, and R.M. Smith. Ten experimental (7 line and 3 point source ignitions) and one wild-fire documented under low to extreme fire danger conditions. Diurnal fuel moisture content sampling also undertaken. Preliminary data analysis nearly completed.
5. (a) Presented guest lecture and prepared handout (Alexander 1982b) on an overview of the CFFDRS to University of Alberta undergraduate forest fire management class. (Feb. 15)
- (b) Organized 4-day advanced fire behavior course for Alberta Forest Service fire staff in cooperation with Hinton Forest Technology School (D. Quintilio). Served as one of three instructors. (Apr. 5-8)
- (c) Requested to give expert opinion evidence by Alberta Forest Service in a court case involving violations of the Forest & Prairie Protection Act. Met with Crown Counsel in Peace River for strategy session (Apr. 30) and attended two trial sessions in High Prairie. (May 3 and Aug. 23)
- (d) Attended 8th annual meeting of the Central Region Fire Weather Committee in Prince Albert, Sask. (Dec. 7)  
Attended 21st meeting of the Pacific Region Fire Weather Committee in Vancouver, B.C. as current chairman of the Western Region Fire Weather Committee. (Nov. 19)
- (e) Acted as external reviewer for two unsolicited manuscripts:
  - (1) Probe Rapidly Measures Fuel Moisture Content (Fire Management Notes article) by R.W. Blank and others;
  - (2) Can. J. For. Res. article on crown fuel weights by CJFR Associate Editor for Fire.

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<sup>1</sup> Van Wagner, C.E., M.E. Alexander, B.D. Lawson and B.J. Stocks. 1982. Proposed extension of the Canadian Forest Fire Danger Rating System (CFFDRS). Can. For. Serv. Fire Danger Group, Mimeo Rep. 12 pp.

- (f) Requested by Northern Affairs Program - Regional Fire Centre to assess applicability of Compu-Trac Moisture Analyzer to determining moisture content of N.W.T. fuels. Preliminary testing carried out.
  - (g) Demonstrated use of the Forest Technology Systems Ltd. automatic fire weather station to approximately a dozen persons from the University of Alberta, Alberta provincial government agencies, and DOE.
6. Compilation and organization of fuels, surface fire weather observations, fire danger ratings, climatological conditions, and meteorological characteristics associated with the behavior of seven major wildfires partially completed. Considerable progress made on two case histories/studies (1980 Rolling River/Manitoba, 1980 DND-4-80/Alberta). File report listing the world literature on the subject of wildfire case histories/studies and recommended outline for the preparation of wildfire case histories/studies prepared (Alexander 1982e).
  7. Major commitment to N.W.T. experimental burning project prevented any major progress towards meeting this goal. Documented surface fire weather observations associated with operational prescribed burn at Elk Island National Park (May 12).
  8. Preparation of Forest Management Note not completed. However, progress made in: (a) developing a table for estimating the standard 10-min/10 m wind speed from maximum gust observed at "eye-level" with a hand-held wind meter (e.g., Dwyer); (b) survey of commercially available hand-held wind speed indicators; and (c) review of applicable literature.
  9. All experimental rate of fire spread data and associated information on file at NoFRC was assembled for the CFFDRS national fire behavior data bank (e.g., computer calculation of FWI and associated components). An initial plan of attack formulated to ensure adequate documentation of data (e.g., daily fire weather observations) and publication.
  10. Published a revision of the Fine Fuel Moisture Code diurnal adjustment table as a Forest Management Note (Alexander 1982f).
  11. Submitted proposal to and obtained permission from CFS-HQ to publish an annotated bibliography on the Canadian Forest Fire Danger Rating System as a Forestry Technical Report. Prepared first draft and placed on word processor. G.P. Delisle completed French translations of titles and abstracts.
  12. Published journal note (Alexander 1982g).



11. Goals for 1983-84:

1. Publish Information Report on Fire Behavior in the Black Spruce-Lichen Woodland Fuel Complex: the Porter Lake Project, N.W.T.
2. Publish Information Report on Spring Fires in a Semi-Mature Trembling Aspen Stand.
3. Publish Forest Management Note "Tables for Determining Spring Drought Code Starting Values in West-Central and Northern Canada".
4. Publish Can. For. Serv. Res. Notes article "Prescribed Fire Behavior and Impact in an Eastern Spruce-Fir Slash Fuel Complex".
5. Publish paper "Extreme Fire Behavior: a wildfire case study from east-central Alberta" in the proceedings of the Seventh Conference on Fire and Forest Meteorology.
6. Publish French (co-authored with G.P. Delisle) and English versions of Forestry Technical Report "An Annotated Bibliography on the Canadian Forest Fire Danger Rating System".
7. Coordinate national CFS inter-establishment documentation team effort associated with an experimental burning project in the lowland black spruce fuel type, N.W.T. (July 1983).
8. Participate as W & N Region representative in cooperative projects of the CFS National Fire Danger Working Group, including continued development of the Fire Behavior Indexes subsystem.
9. Provide advice and services as required, including serving as the CFS W & N Region representative on the Central and Western Region Fire Weather Committees.

12. Publications/Reports:

- Alexander, M.E. 1982a. The 1968 Lesser Slave Lake Fire: historical analysis of the Canadian Forest Fire Weather Index. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. Study NOR-5-191 File Rep. No. 1. 31 pp.
- Alexander, M.E. 1982b. Canadian Forest Fire Danger Rating System: an overview. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. Study NOR-5-191 File Rep. No. 2. 10 pp.
- Alexander, M.E. 1982c. Calculating spring Drought Code starting values in the prairie provinces and Northwest Territories. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. For. Manage. Note 12. 4 pp.

Alexander, M.E. 1982d. Calculating and interpreting forest fire intensities. Can. J. Bot. 60(4):349-357. (erratum: 60(10):2185.)

Alexander, M.E. 1982e. Bibliography of wildfire case histories and studies. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. Study NOR-5-191 File Rep. No. 4. 7 pp.

Alexander, M.E. 1982f. Diurnal adjustment table for the Fine Fuel Moisture Code. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. For. Manage. Note 17. 3 pp.

Lee, C.Y. and M.E. Alexander. 1982. Calculating spring Drought Code starting values with the Texas Instruments Model 59 hand-held calculator. Environ. Can., Can. For. Serv., North. For. Res. Cent., Edmonton, Alta. Study NOR-5-191 File Rep. No. 3. 7 pp.

Alexander, M.E. 1982g. Fire behavior in aspen slash fuels as related to the Canadian Fire Weather Index. Can. J. For. Res. 12(4):1028-1029.

13. Signatures:

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[Signature]  
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