An aerial photograph of a wildfire burning in a dense forest. The fire is concentrated in two main areas, with bright orange and yellow flames rising from the trees. Thick black smoke billows upwards from the fire, partially obscuring the sky. The surrounding forest is dark green, providing a stark contrast to the intense colors of the fire.

# **On the Value of Wildland Fire Behavior Case Studies**

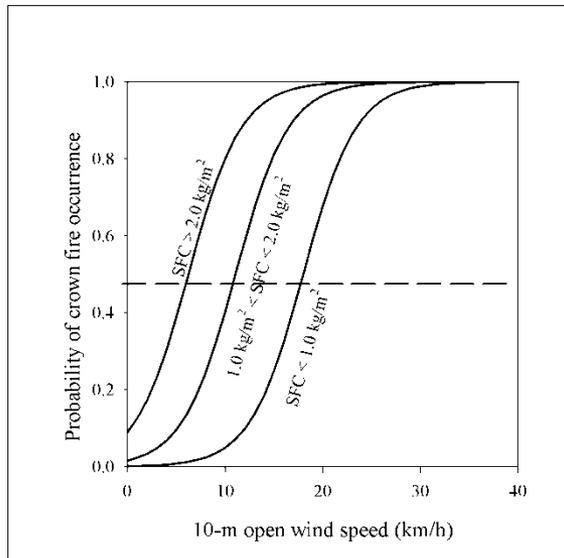
**Marty Alexander  
University of Alberta, Edmonton, AB**

**Dave Thomas  
Renoveling, Ogden, UT**

*Interior West Fire Ecology Conference: Challenges and Opportunities in a Changing World*  
Snowbird Resort, Utah, November 14-17, 2011

The most effective means of judging potential fire behavior is considered to be the coupling of  
**(1) mathematical modelling** with  
**(2) experienced judgement** (e.g., “expert opinion”),  
and **(3) published case study knowledge** (e.g.,  
wildfires and operational prescribed fires)

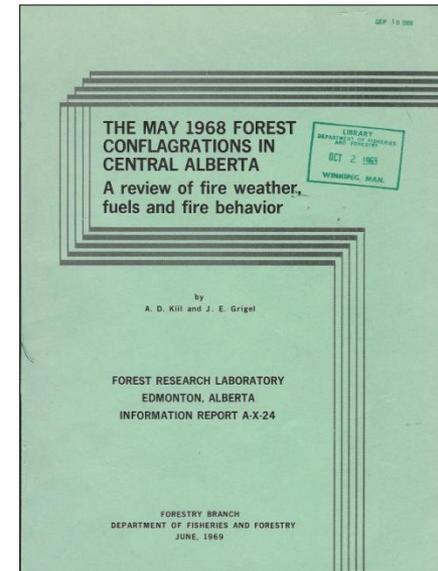
1



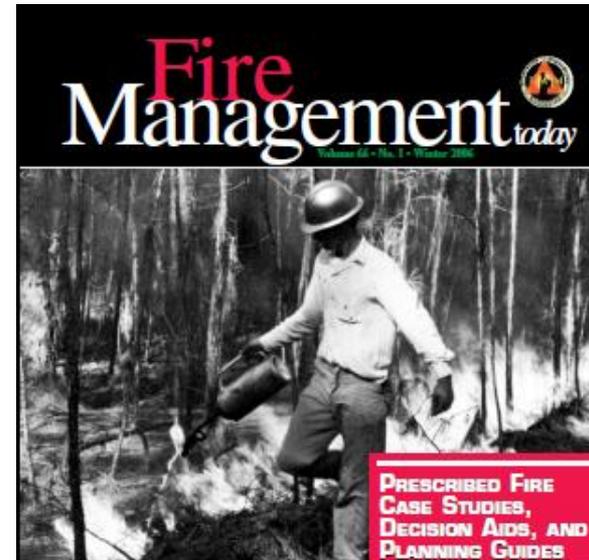
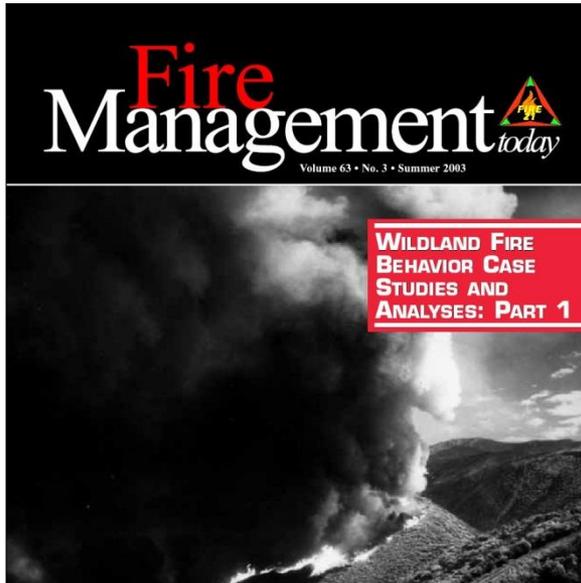
2



3



# The "Case" for Case Studies



**The 1988 Fires of Yellowstone and Beyond as a Wildland Fire Behavior Case Study**

by Martin E. Alexander

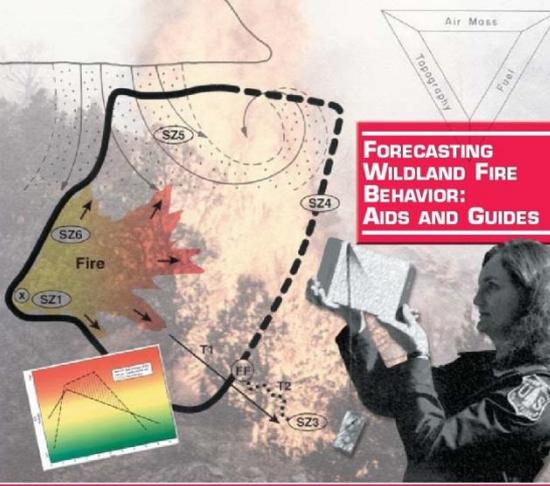




High-intensity crown fire behavior on the Clover-Mist Fire in Yellowstone National Park during the 1988 fire season. Photo: Jim Peaco, National Park Service, courtesy of Yellowstone Digital Slide File, 1995.

**Fire Management today**

Volume 64 • No. 1 • Winter 2004



**FORECASTING WILDLAND FIRE BEHAVIOR: AIDS AND GUIDES**

United States Department of Agriculture  
Forest Service

**Wildland Fire Behavior Case Studies and the 1938 Honey Fire Controversy**

Martin E. Alexander and Stephen W. Taylor

Over the past 90 years, fire research has contributed to our understanding of wildland fire behavior through laboratory and field experiments, physical and empirical modeling, numerical simulations, analyses of individual fire reports, and wildfire case studies. Although basic research on combustion is essential to a full understanding of fire behavior, such research would not be very useful without actual field experience gained and case study documentation (Strom 1999).

In general terms, what is a case study? Contributions on Wikipedia (<http://www.wikipedia.org/>) propose that case studies "provide a systematic way of looking at events, collecting data, analyzing information, and reporting the results." With the renewed interest in carrying out research on active wildfires (e.g., Lentile and others 2002a), it's worth reexamining the history of a good case study.

To this end, this article summarizes the findings from the case study of the controversial Honey Fire of 1938, originally published in *Fire Control Notes* by Olsen (1941)—one of the first comprehensive case studies of a wildland fire undertaken by fire behavior researchers. This account was reprinted in the Fall 2003 issue of *Fire Management Today*, the first of three special issues devoted to the subject of wildland fire behavior (Thomas and Alexander 2006).

**The Story of the Honey Fire**

The story of the Honey Fire and the ensuing controversy is as much about human behavior as it is about fire behavior. In broad outlines, the situation was as follows. A fire behavior research crew happened upon a newly started wildfire, but rather than engaging in any suppression action, the crew began documenting its behavior. This course was taken partly because the crew had advance clearance to do so. The fire became one of the largest fires in the region that year and was finally contained by local fire suppression forces. The research crew's decision to not fight the Honey Fire raised some eyebrows.

Later, a member of the research crew published a case study that not only analyzed the fire's behavior but also critiqued the actions of the suppression forces. That article, in turn, provoked a harsh outcry.

**Synopsis of the Honey Fire Case Study**

**Chronology and Behavior**

The major run of the Honey Fire took place on January 25, 1938, on the Catahoula Ranger District of the Klatskanie National Forest in north-central Louisiana (Fig. 1). A total of 434 fires were to burn more than 12,800 acres (5,186 ha) on the Klatskanie National Forest in 1938 (Horns 1982), and the Honey Fire was one of the many human-caused fire occurrences that year. Interestingly enough, Horns (1982, 1994) did not mention the Honey Fire in her historical accounts of the Klatskanie National Forest.

The Honey Fire was the result of careless actions on the part of freight train employees disposing of burning waste along the east side of the Louisiana & Arkansas Railroad, approximately 1.5 miles (2.4 km) north of Bentley, LA, at around 9:50 a.m. The lookout at the Catahoula Tower, located 2 miles (3.2 km) to the east, detected the fire within 2 minutes, a very acceptable discovery time (Stacked and Hirsch 1932b).

Carl Olsen, a forester with the Southern Forest Department

15

# General Value of Case Studies

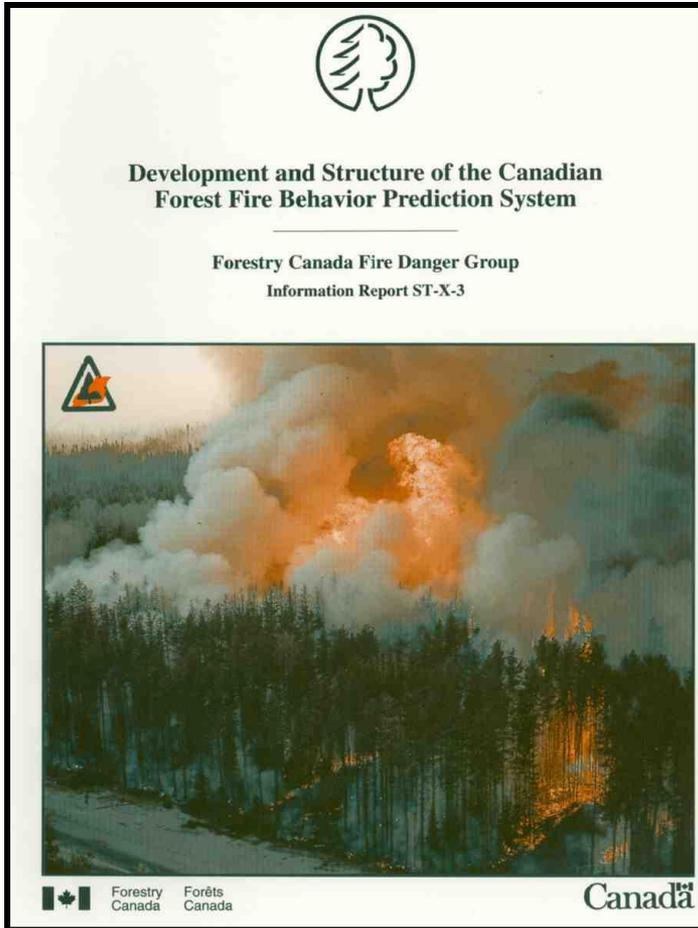
***“Time and time again case histories have proven their value as training aids and as sources of research data.”***

**Chandler (1976)**

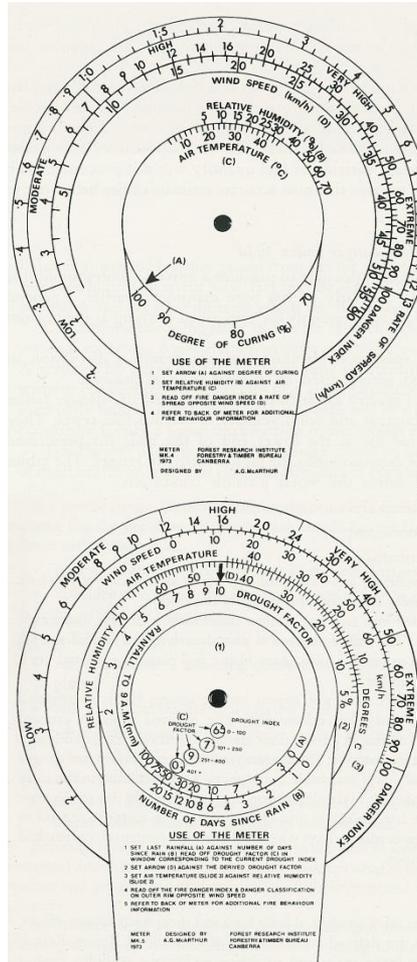


Craig C. Chandler  
USFS Fire Research Director

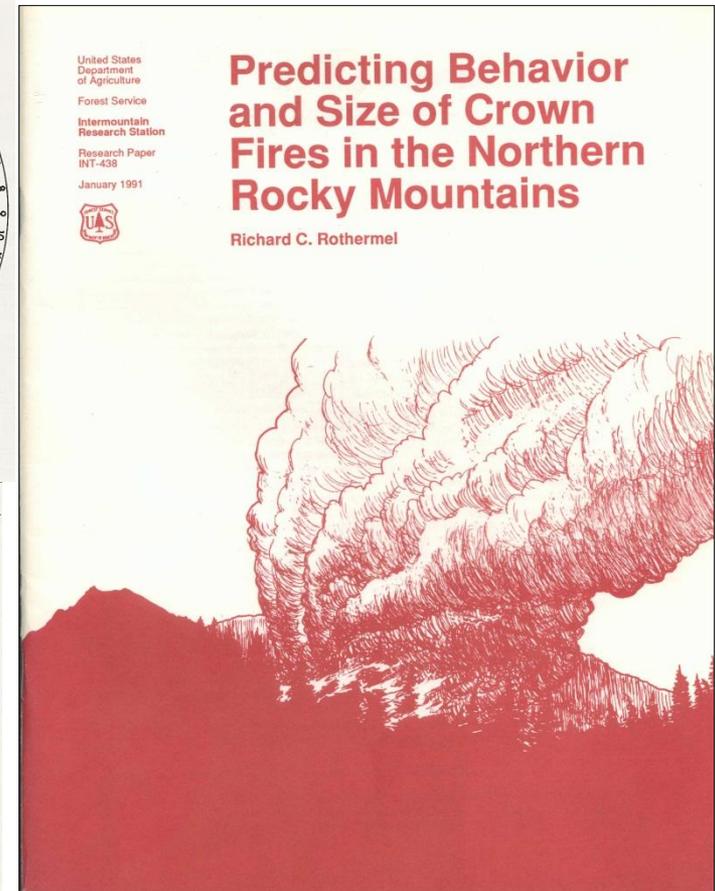
# Most empirical-based fire behavior prediction systems are dependent to some extent on wildfire observations



Canada



Australia

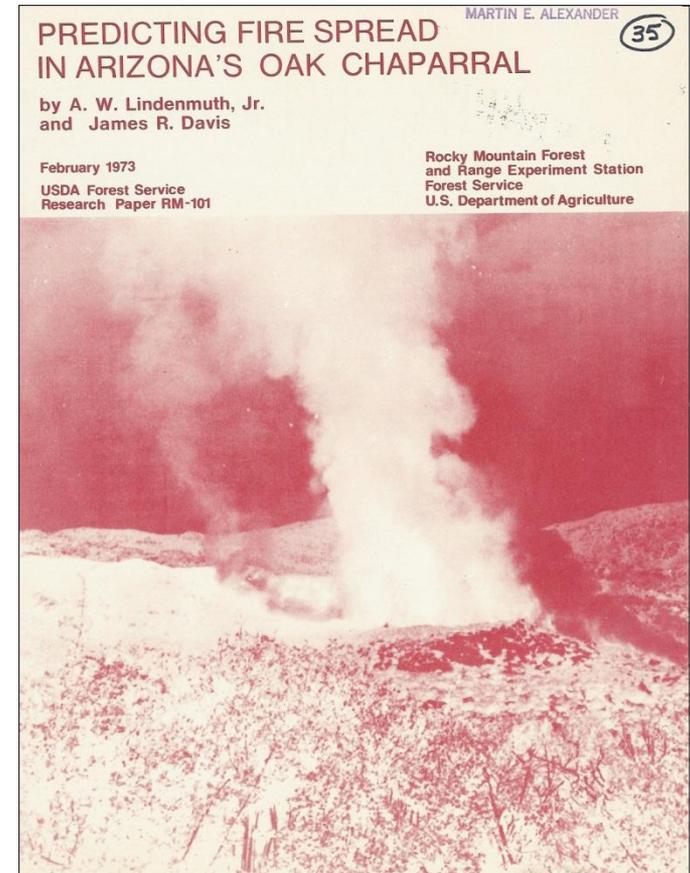


U.S.A.

# Information gleaned from wildfires also valuable in testing & evaluating fire behavior models and systems



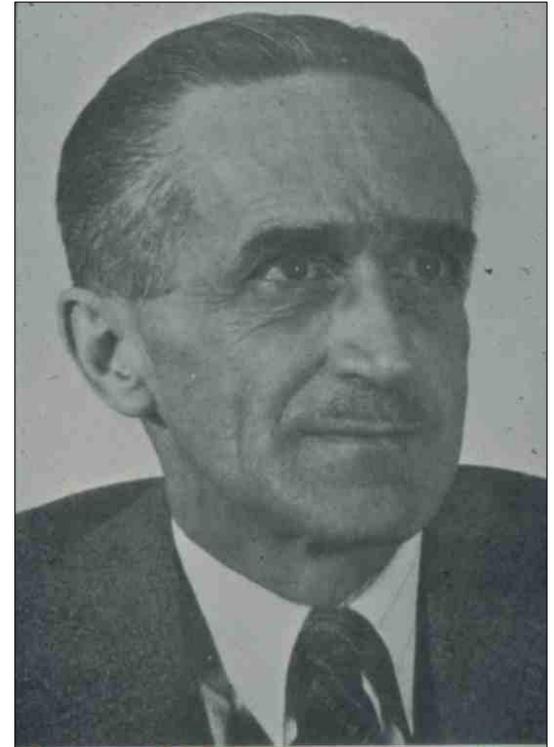
**1972 Battle Fire, Prescott NF, AZ**



# First Wildland Fire Case Study?

**Gisborne, H.T. 1927. Meteorological Factors in the Quartz Creek Forest Fire. *Monthly Weather Review* 55: 56-60.**

**1926 Quartz Creek Fire,  
Kaniksu National Forest,  
northern Idaho – adjacent  
to the Priest River  
Experimental Forest**

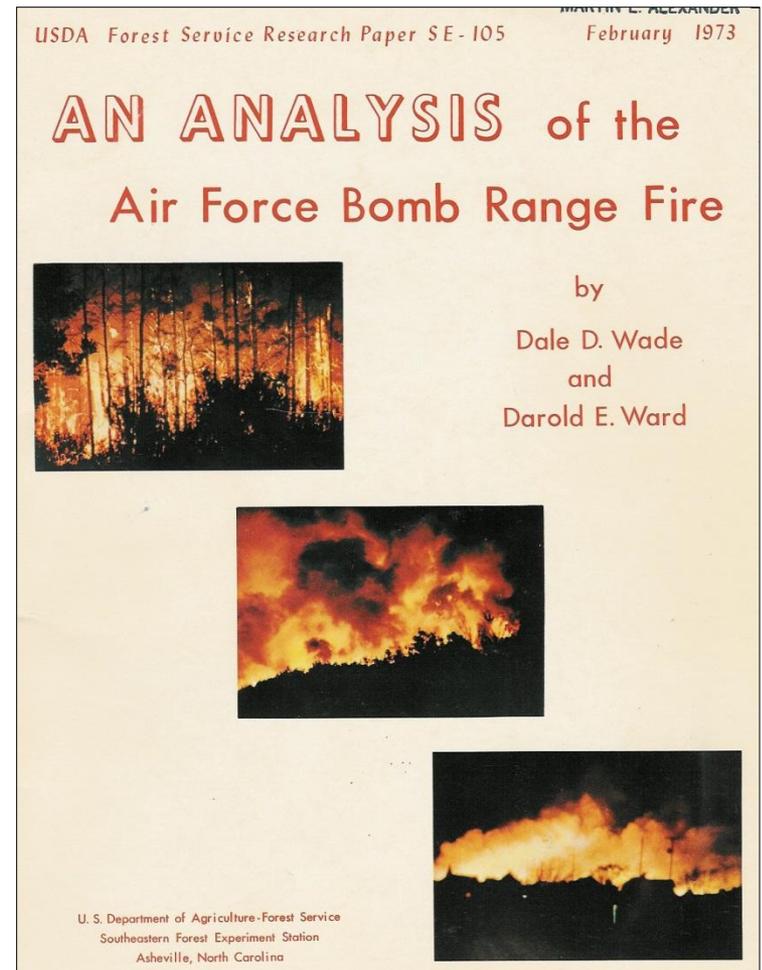


# Fire Documentation Team – Southern Forest Fire Laboratory (SFFL), Macon, GA

## SFFL Mobile Fire Laboratory

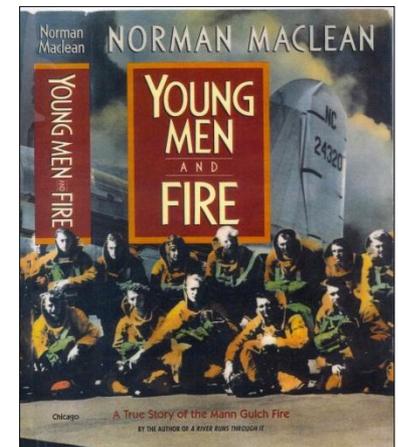


inside  
laboratory  
trailer



# Approaches to Case Studies

- Designated fire research documentation teams
- Fire behavior analyst role on fire incidents
- After-the-fact accident investigations or “near misses” (e.g., fatalities, fire shelter deployments)
- Fire behavior postmortems
- Retrospective analyses



# Examples of Fire Behavior Officer/Fire Behavior Analyst Related Reports



United States Department of Agriculture  
**Forest Service**  
 Pacific Northwest Forest and Range Experiment Station  
 Research Note PNW-401  
 October 1982




## Predicting Wildfire Behavior in Black Spruce Forests in Alaska

Rodney A. Norum

USDA  
 FOREST SERVICE  
 RESEARCH  
 PAPER NC-76  
 1972

## FIRE BEHAVIOR of the BASIN FIRE

*Sierra National Forest* JULY 13-22, 1961

Craig C. Chandler

PACIFIC SOUTH  
 FOREST AND  
 EXPERIMENT STATION  
 BERKELEY - CALIFORNIA

FOREST SERVICE - U. S. DEPARTMENT OF AGRICULTURE

## FIRE WEATHER and BEHAVIOR of the LITTLE SIOUX FIRE

RODNEY W. SANDO  
 DONALD A. HAINES

NORTH CENTRAL FOREST EXPERIMENT STATION  
 FOREST SERVICE • U. S. DEPARTMENT OF AGRICULTURE

...r system, when properly adjusted, accurately predicts forward length of wildfires in black spruce (*Picea mariana* (Mill.)) . After fire behavior was observed and quantified, adjustment and assigned to the selected fuel models to correct the coincide with observed values. Spotting distance models ing distances if some corrections and assumptions are made. are described.

...r (forest), Alaska, black spruce, *Picea mariana*.

... of fire behavior are essential for making tactical plans for es in Alaska's black spruce (*Picea mariana* (Mill.) B.S.P.) ue problems in prediction.

...ent fire behavior system—Rothermel (1972) fire spread eptance as an accurate means of predicting fire behavior. le (Albini 1976) version of the model, in the form of lexibility, some situations are not adequately described by the In such cases, adjustment and adaptation of the model are havior can be accurately forecast. The typical black spruce/ tana/*Hylocomium splendens*-*Pleurozium schreberi*) forests of roblem.

...tempt to use the Albini nomographs to predict wildfire 977, when I was fire behavior officer for a fire in an area of llage of Hughes in interior Alaska. The fire burned for several that ranged in steepness from flat to 32 percent under a tions. The fire burned as a surface fire, presenting an ideal ng rates of spread and flame lengths under varied conditions re content. In addition, the availability of an accurate model of a microwave fuel moisture meter (McLeod 1976) sure the moisture content of fuels collected near the fire. umidity, and the velocity and direction of the wind were hen fuel samples were collected. Everything necessary to ns and fire behavior was available for comparison with values nomographs.

...earch forester, Pacific Northwest t Station, Institute of Northern Fairbanks, Alaska 99701.

# Examples of Fatality and Close-call Reports

## *Fire Weather and Fire Behavior in the 1966 Loop Fire*

C. M. COUNTRYMAN, M. A. FOSBERG, and  
R. C. ROTHERMEL  
*Forest Service, U.S. Department of Agriculture*  
M. J. SCHROEDER  
*U.S. Weather Bureau*

Southern California as the Santa Ana winds and the effects in the Angeles National Forest firefighters.

**T**EN Trapped, firefighters in southern California near the boundary of a forest fire overran a line of firefighters were burned and later died from their injuries.

It is Forest Service policy in fire control to analyze the fire to determine the cause and to recommend ways to prevent future fires.

Fire behavior usually varies. Thus fire behavior analysis attracts attention in fire-accident investigations and weather analyses.

This description of the Loop Fire disaster is a fire protection of dwellings. A fortunate accident emphasizes probable fire behavior.

FIRE  
BEHAVIOR

The fall fire season is characterized by normal precipitation.

COMMONWEALTH OF AUSTRALIA  
DEPARTMENT OF NATIONAL DEVELOPMENT  
FORESTRY AND TIMBER BUREAU

## THE WANDILO FIRE, 5 APRIL 1958

### Fire behaviour and associated meteorological and fuel conditions

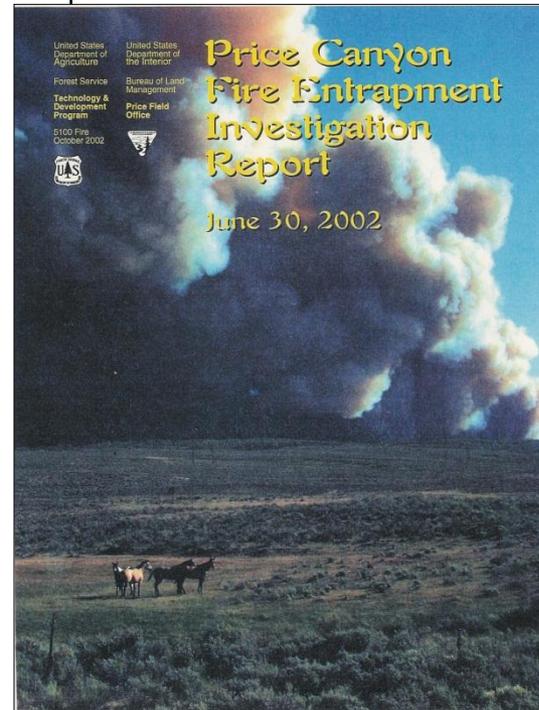
BY

A. G. MCARTHUR, D. R. DOUGLAS  
AND L. R. MITCHELL

FOREST RESEARCH INSTITUTE

## Two Rural/Urban Interface fires in the Wellington suburb of Karori: assessment of associated burning conditions and fire control strategies

L.G. Fogarty  
June 1996



197  
Technical Series Report No. 1



FRI

# Examples of Post-fire Investigation Reports



A Publication of the  
National Wildfire  
Coordinating Group

Sponsored by  
United States  
Department of Agriculture

United States  
Department of the Interior

National Association of  
State Foresters

## The Mack Lake Fire

September 1983  
PMS 494



United States  
Department of  
Agriculture

Forest Service

Intermountain  
Research Station

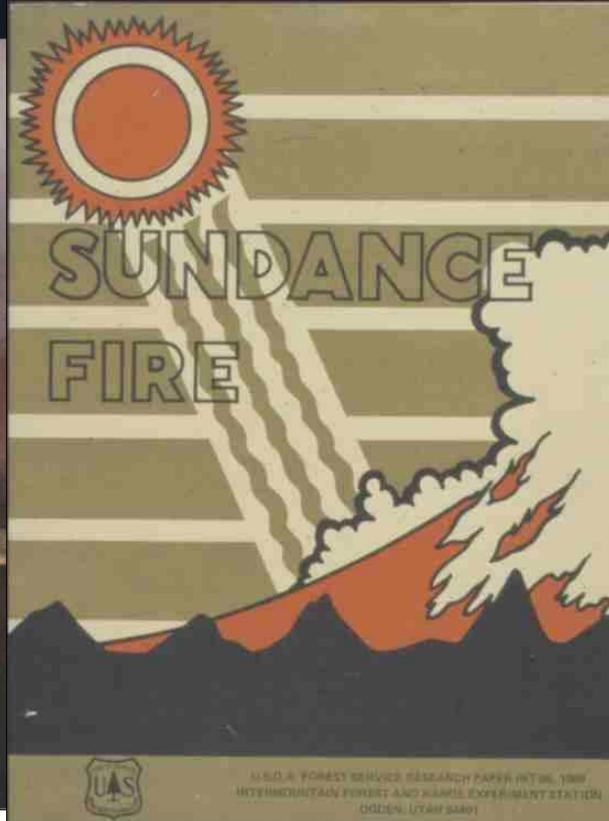
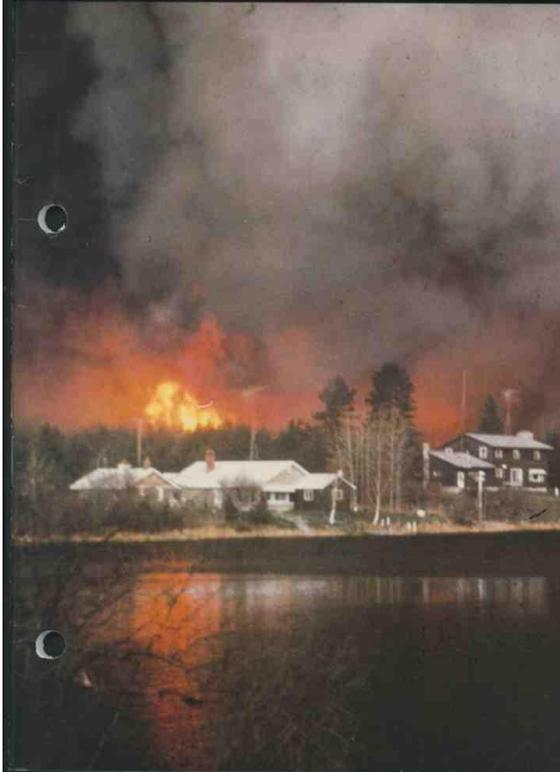
General Technical  
Report INT-411R-301

May 1987



## Wildfire Case Study: Butte City Fire, Southeastern Idaho, July 1, 1994

Brof W. Butler  
Timothy D. Reynolds



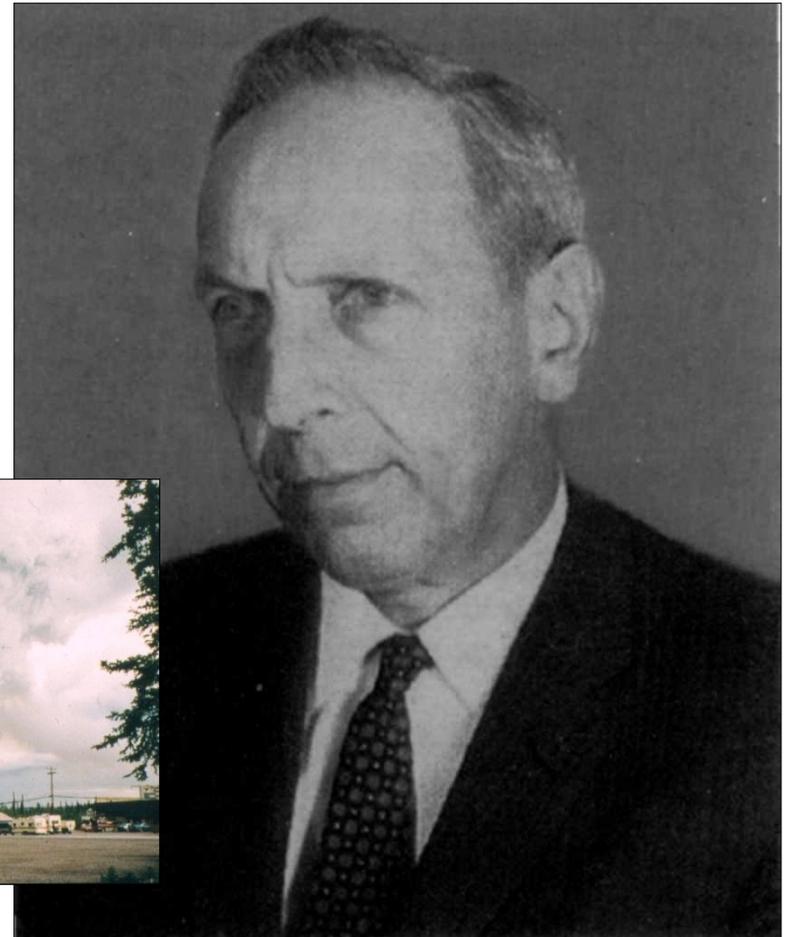
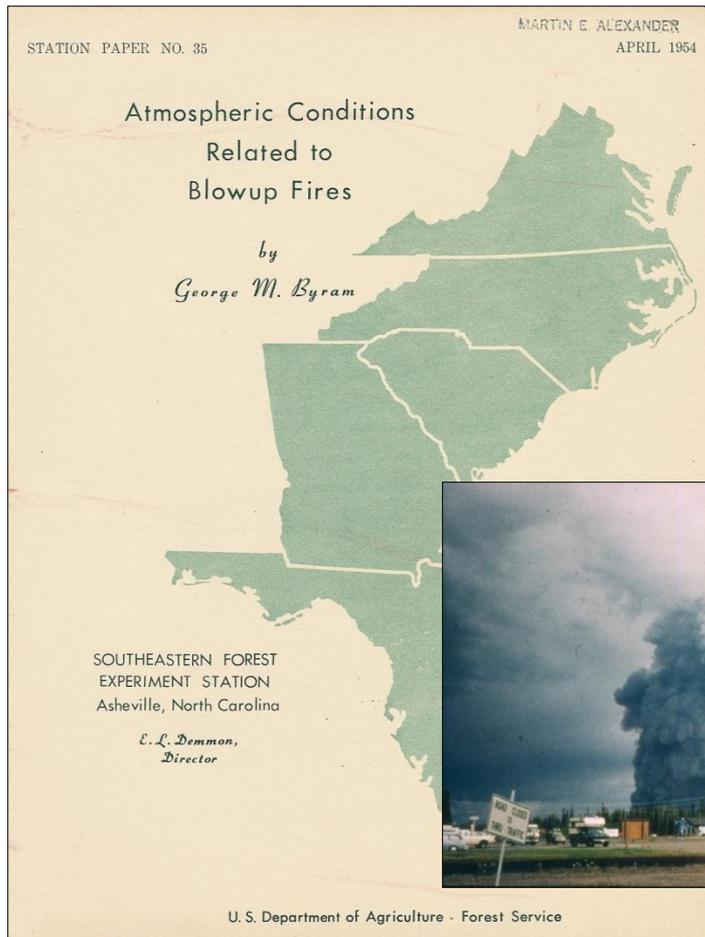
## SUNDANCE FIRE



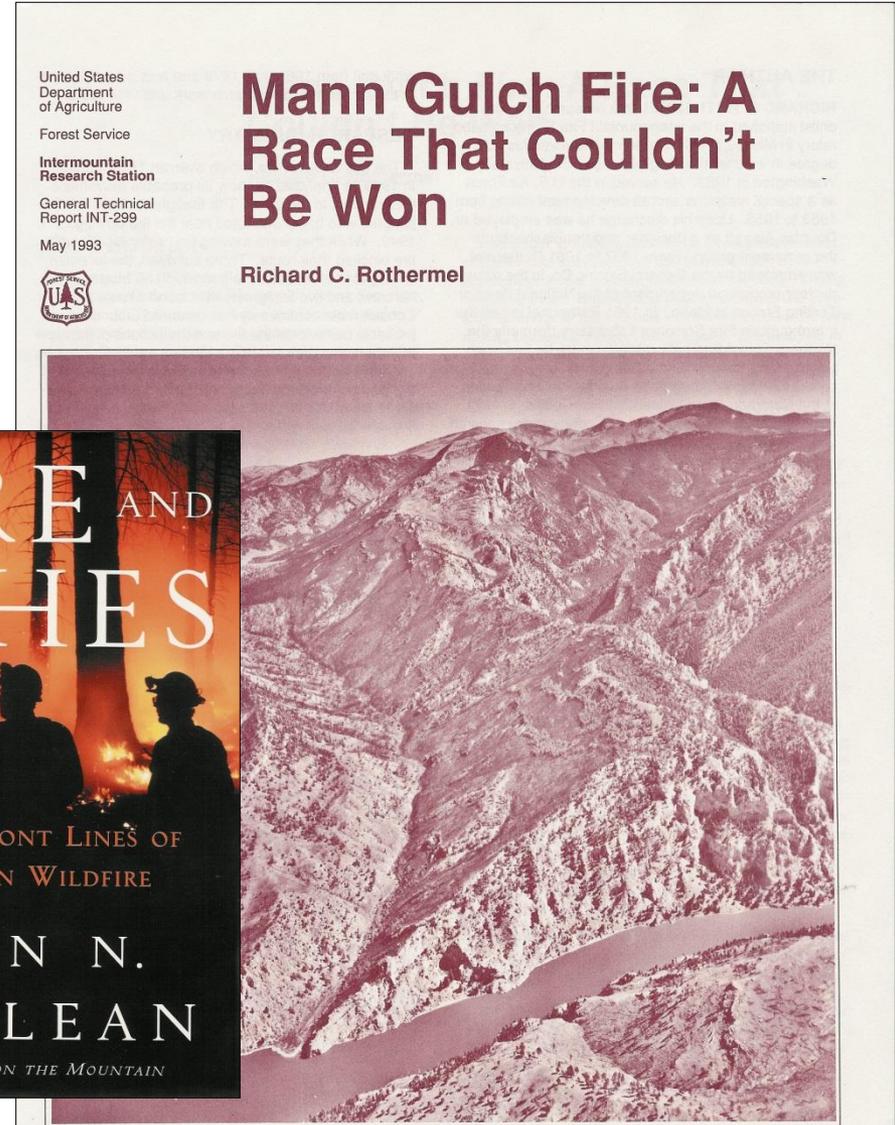
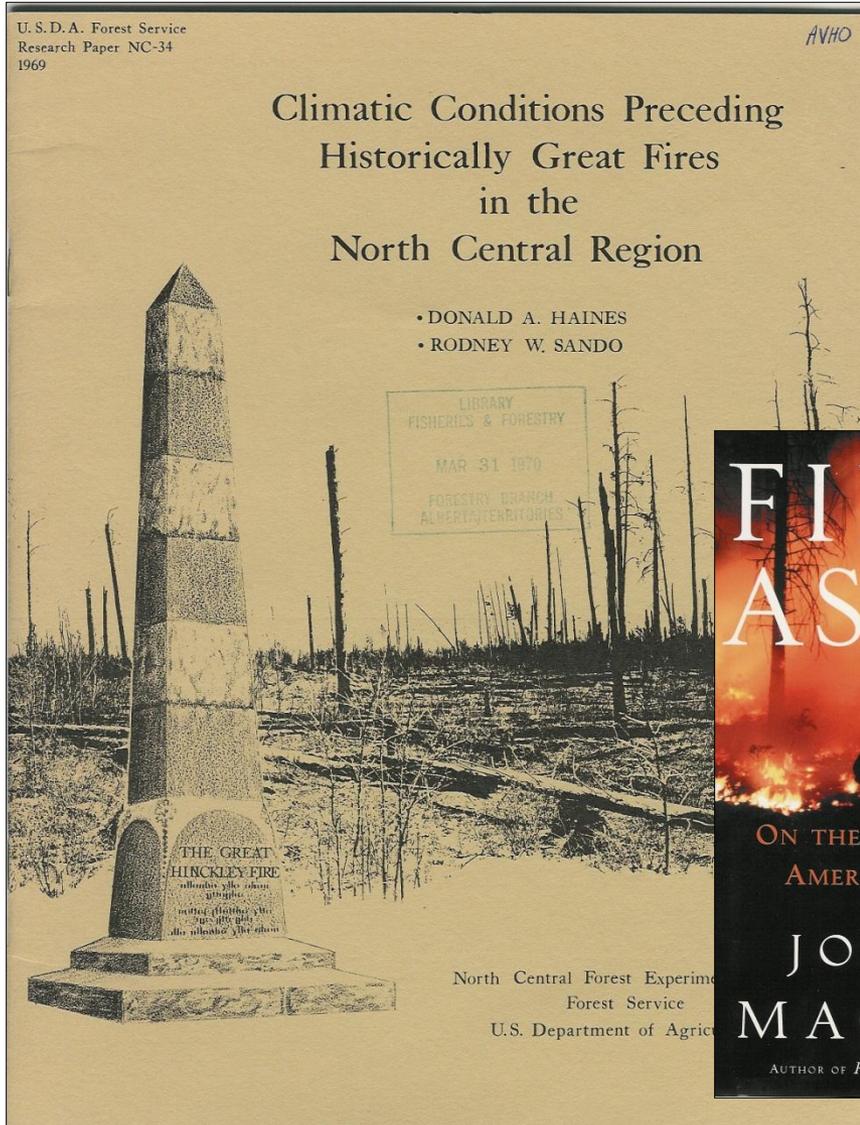
U.S.D.A. FOREST SERVICE RESEARCH PAPER INT-366, 1987  
WYTHMOUNTAIN FOREST AND RANGE EXPERIMENT STATION  
OGDEN, UTAH 84401



# George Byram made extensive use of the case study method in his research on blow-up fires



# Examples of Historical Re-analyses



# Pragmatic Value of Case-Studies

- **To learn from them**
- **Not to be surprised “again”**
- **To practice, hone skills**



# Safety Value of Case Studies

- **Fire refreshers**
- **Sand-box exercises**
- **Tailgate safety meetings**



# Key Questions

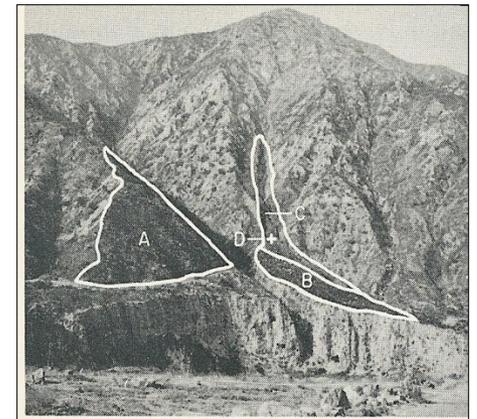
- Can we apply this knowledge?
- Have we learned all that we can from this case study?
- Could the same situation occur today?
- What are we going to do differently after studying this case study?



1937 Blackwater Fire

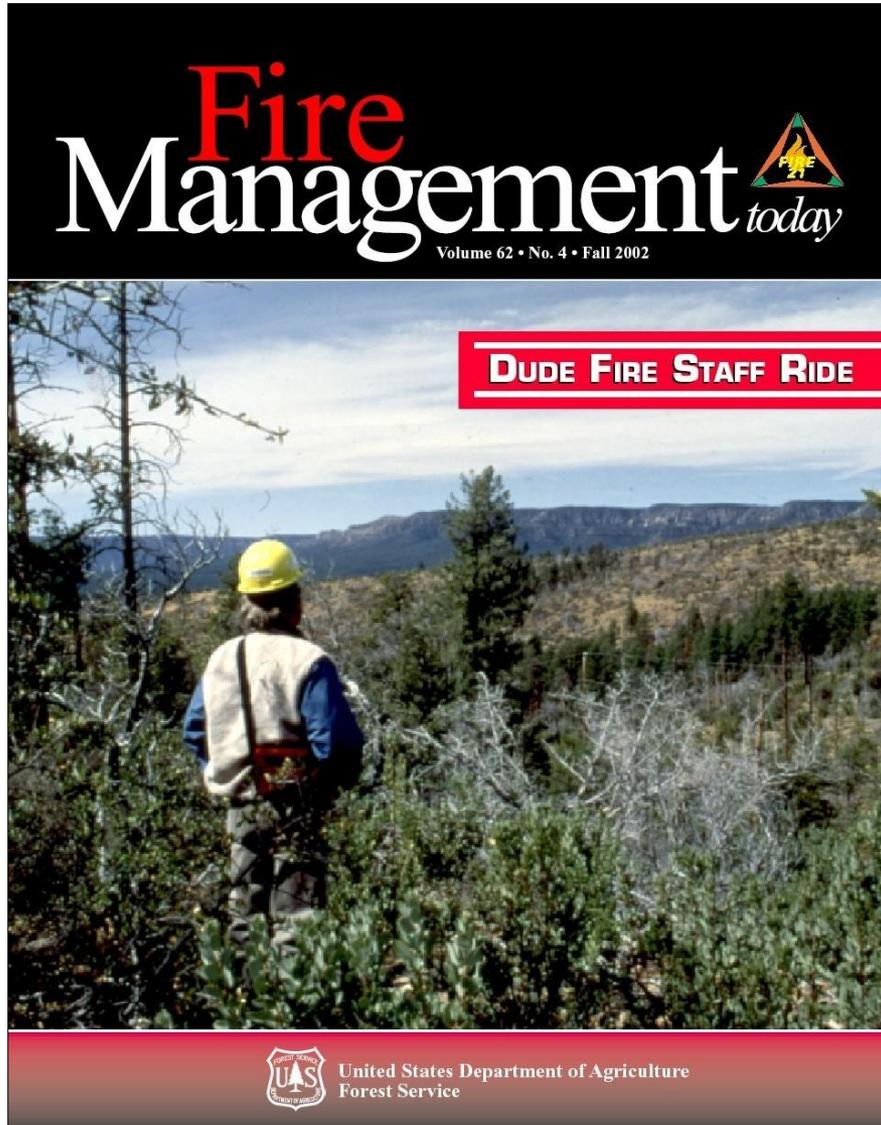


1949 Mann Gulch Fire



1966 Loop Fire

# Staff Rides and Case-Studies



**Fire**  
**Management** *today*

Volume 62 • No. 4 • Fall 2002

**DUDE FIRE STAFF RIDE**

United States Department of Agriculture  
Forest Service

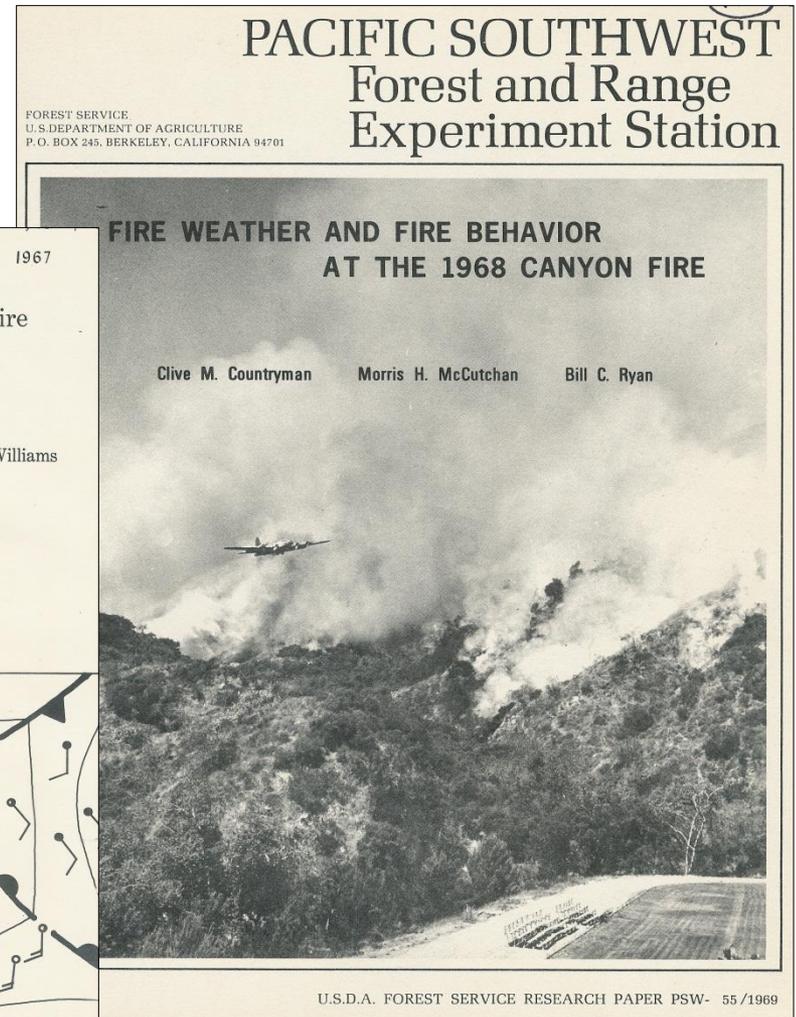
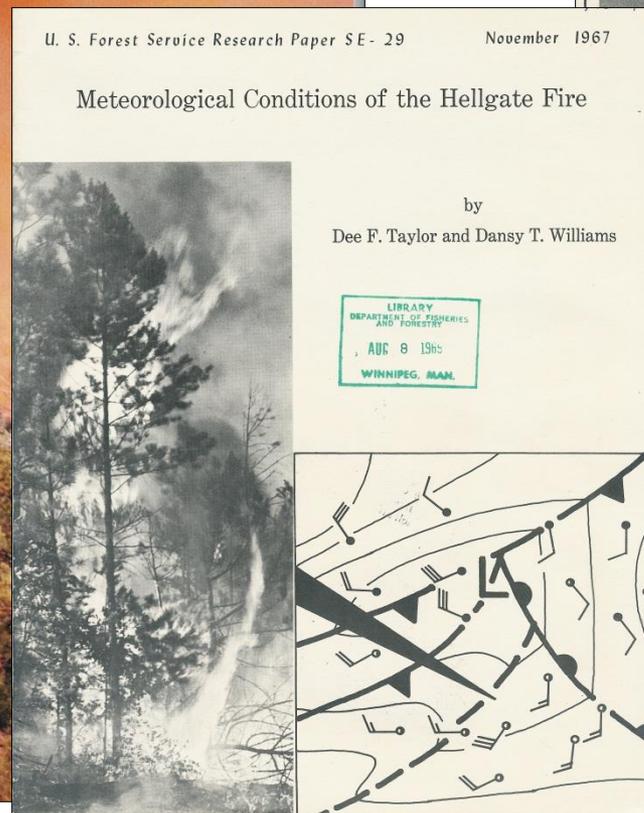
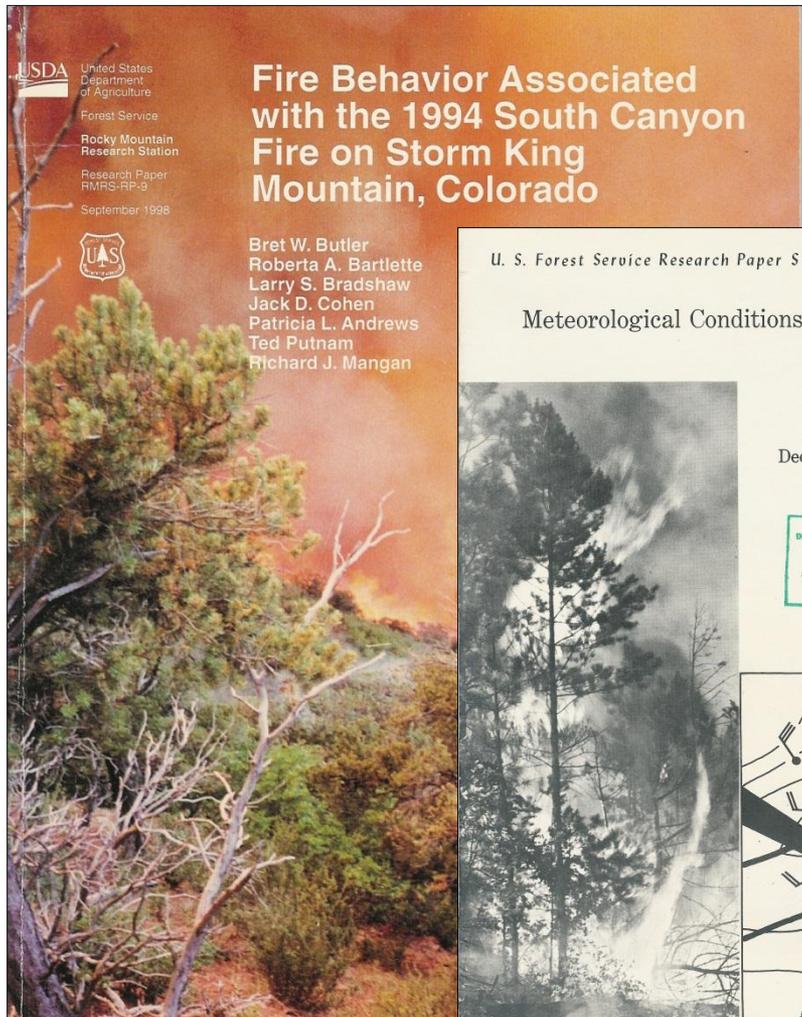
The image shows the cover of the magazine 'Fire Management today'. The title is in large, bold letters, with 'Fire' in red and 'Management today' in white. Below the title, it says 'Volume 62 • No. 4 • Fall 2002'. The main image on the cover is a photograph of a person in a yellow hard hat and a white and blue jacket, standing on a hillside looking out over a landscape of trees and mountains. A red banner with the text 'DUDE FIRE STAFF RIDE' is overlaid on the image. At the bottom, there is a red banner with the United States Department of Agriculture Forest Service logo and name.



Volume 63, Nos. 3 and 4 of *Fire Management Today* contains 37 previously published wildfire case studies and analyses that appeared in *Fire Management Today* and its predecessors between 1937 and 2001

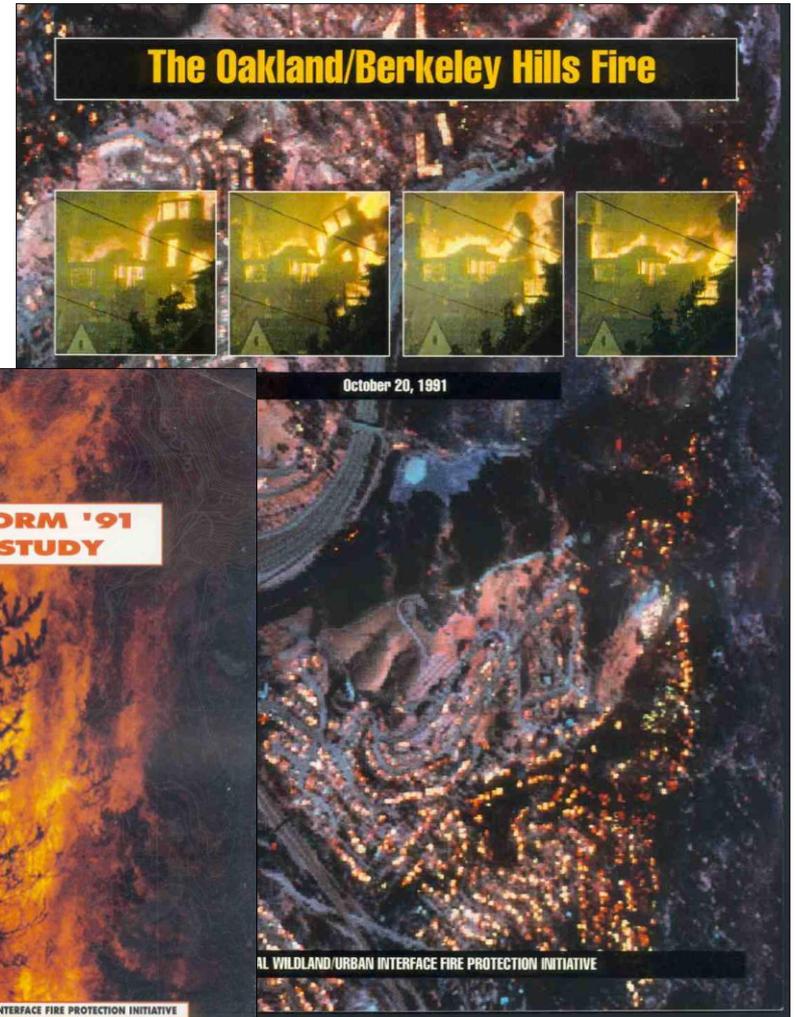
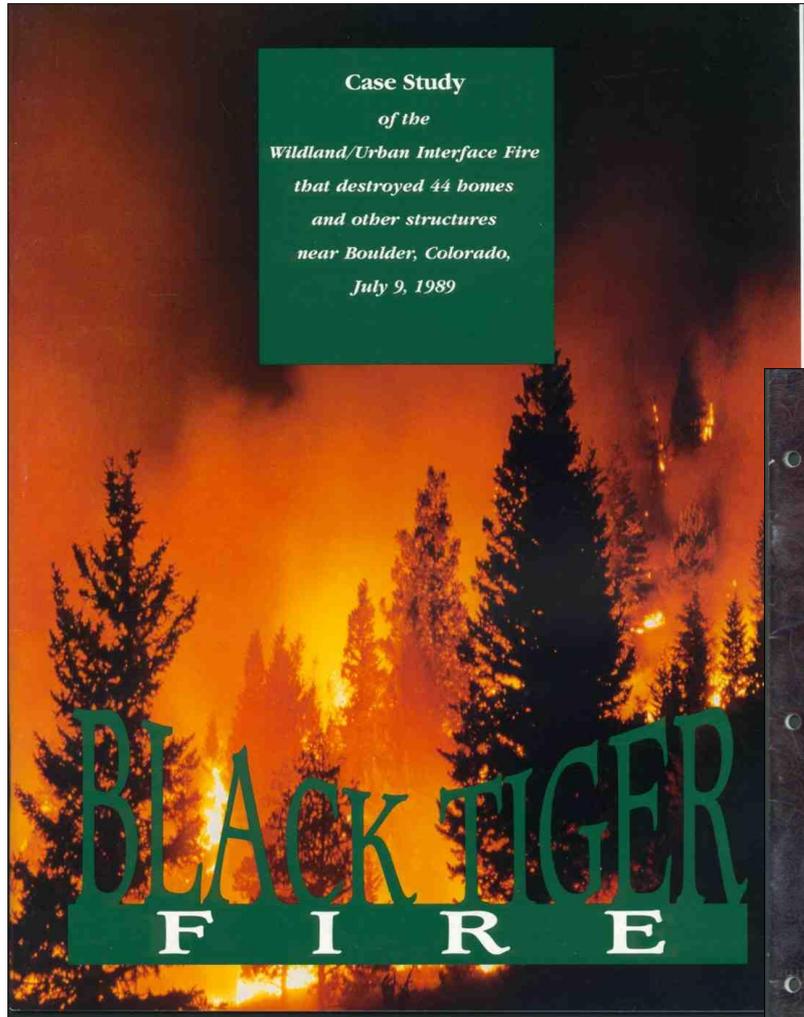


# Some Other Examples of Case Studies – USDA Forest Service



# Some Other Examples of Case Studies

## – National Fire Protection Association



# Some Other Examples of Case Studies – Canadian Forest Service

SEP 18 1969

## THE MAY 1968 FOREST CONFLAGRATIONS IN CENTRAL ALBERTA

A review of fire weather, fuels and fire behavior

by  
A. D. Kiil and J. E. Grigel

FOREST RESEARCH LABORATORY  
EDMONTON, ALBERTA  
INFORMATION REPORT A-X-24

FORESTRY BRANCH  
DEPARTMENT OF FISHERIES AND FORESTRY  
JUNE, 1969

MARTIN E. ALEXANDER O-X-187

## CLIMATIC CONDITIONS BEFORE AND DURING FOUR SIGNIFICANT FOREST FIRE SITUATIONS IN ONTARIO

B.J. STOCKS and J.D. WALKER  
CANADIAN FORESTRY SERVICE

Scale  
1" = 100 mi.

O-X-232

## THE 1974 WILDFIRE SITUATION IN NORTHWESTERN ONTARIO

LIBRARY  
NORTHERN FORESTRY CENTRE  
5320 - 122nd STREET  
ALBERTA  
CANADA

FOR USE IN LIBRARY ONLY  
NON-CIRCULATING

B.J. STOCKS  
CANADIAN FORESTRY SERVICE

O-X-166

## ANALYSIS OF TWO 1971 WILDFIRES IN ONTARIO: THACKERAY AND WHISTLE LAKE

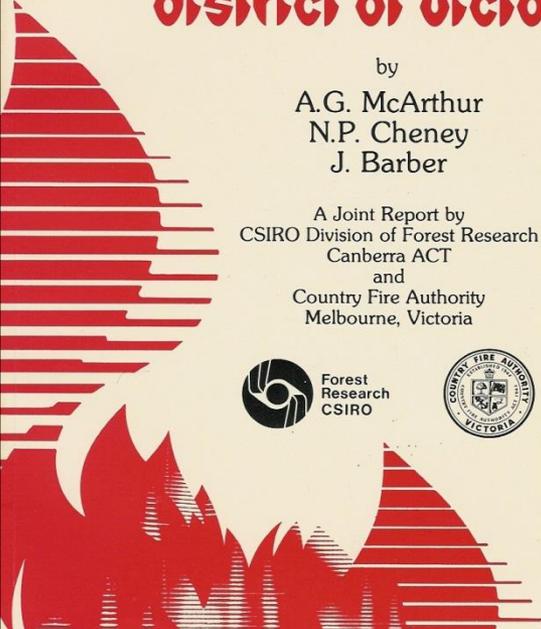
J.D. WALKER and B.J. STOCKS  
CANADIAN FORESTRY SERVICE

# Some Examples of Case Studies – Australasia

**The fires of  
12 February 1977  
in the western  
district of Victoria**

by  
A.G. McArthur  
N.P. Cheney  
J. Barber

A Joint Report by  
CSIRO Division of Forest Research  
Canberra ACT  
and  
Country Fire Authority  
Melbourne, Victoria



Wildfires in the  
Fitzgerald River National Park,  
Western Australia, December 1989

Lachlan McCaw, Terry Maher and Kelly Gillen



Technical Report No. 26 April 1992

Department of Conservation and Land Management



**Fire behaviour, suppression and  
lessons from the Berwick Forest Fire  
of 26 February 1995**

by L.G. Fogarty  
A.F. Jackson and  
W.T. Lindsay



FRI Bulletin No. 197  
Forest and Rural Fire Scientific and Technical Series Report No. 3

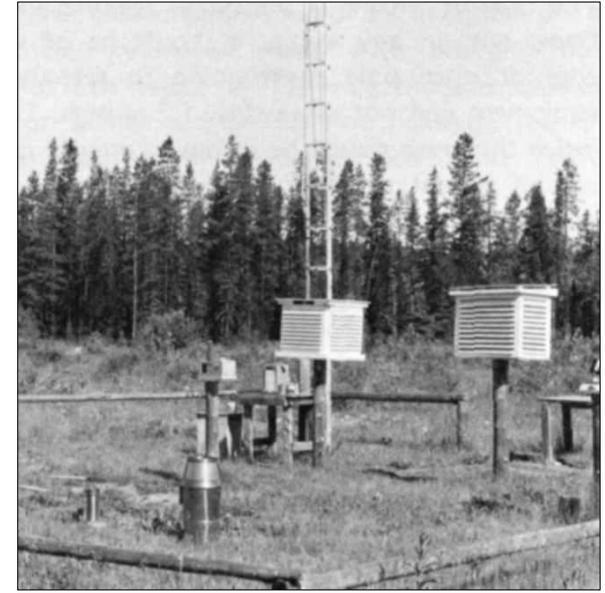


NEW ZEALAND  
FOREST RESEARCH INSTITUTE



# Extending the Usefulness of Case Studies

**From a local fire behavior standpoint, case studies done in one country can be applied to another, if fuel type characteristics are relevant, by interpreting burning conditions through the other country's fire danger rating system.**



# Mack Lake Fire, Michigan

## May 5, 1980

Dry-bulb Temperature 26.9 °C

Relative Humidity 24%

10-m Open Wind 33 km/h

Days Since Rain 6

FFMC 94.6

DMC 35

DC 59

ISI 43.2

BUI 35

FWI 50

# Mack Lake Fire, Michigan May 5, 1980

The following comparisons are based on the major run of the Mack Lake Fire that occurred between 1230 and 1600 hours EDT on May 5, 1980 using FBP System Fuel Type C-4, a 0% Slope and 100% Foliar Moisture Content:

<u>Fire Behavior Characteristic</u>	<u>Predicted</u>	<u>Observed</u>
Head Fire Rate of Spread (m/min)	57	56
Head Fire Intensity (kW/m)	33 660	30 440
Forward Spread Distance (km)	11.5	12.1
Area Burnt (ha)	2534	2743
Fire Perimeter (km)	24.8	20.0

Predicted Type of Fire at the "Head" :

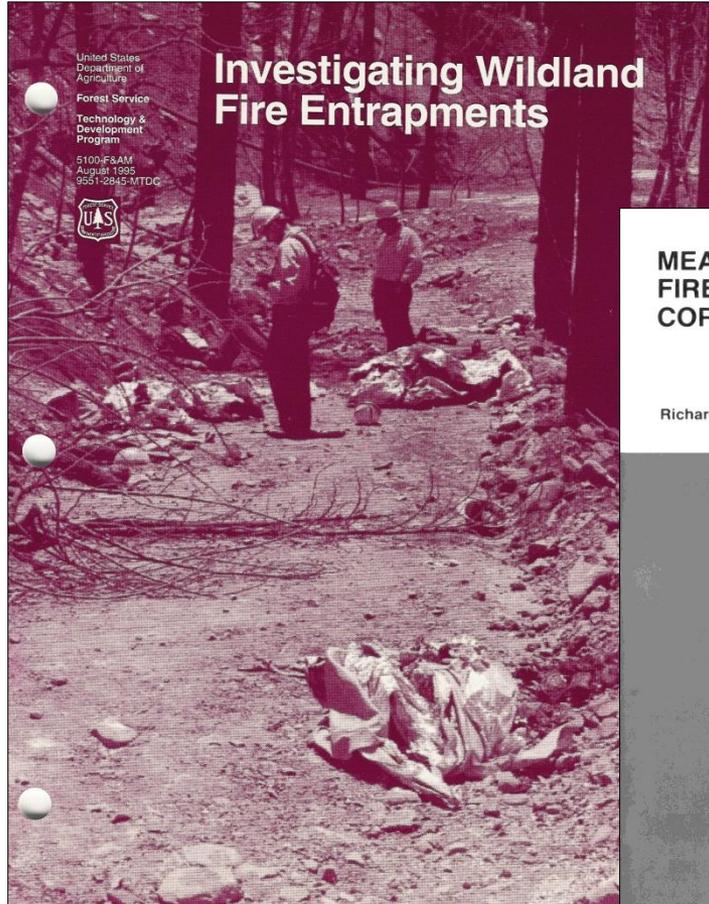
**Continuous Crown Fire (100% Crown Fuel Involvement)**



Everyone has a  
photographic  
memory.

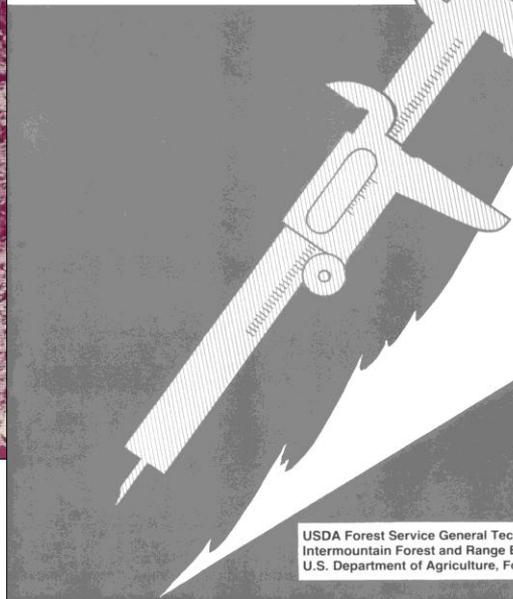
Some just don't  
have film!

# Field Observations and Records



## MEASURING AND INTERPRETING FIRE BEHAVIOR FOR CORRELATION WITH FIRE EFFECTS

Richard C. Rothermel and John E. Deeming



USDA Forest Service General Technical Report INT-93  
Intermountain Forest and Range Experiment Station  
U.S. Department of Agriculture, Forest Service

United States  
Department of  
Agriculture  
Forest Service  
Intermountain  
Forest and Range  
Experiment Station  
Ogden, UT 84401  
General Technical  
Report INT-142  
April 1983



## Field Procedures for Verification and Adjustment of Fire Behavior Predictions

Richard C. Rothermel  
George C. Rinehart



# Stages of Wildfire Observation and Documentation

- **Detection**
- **Initial attack**
- **Later stages of suppression**
- **After containment**

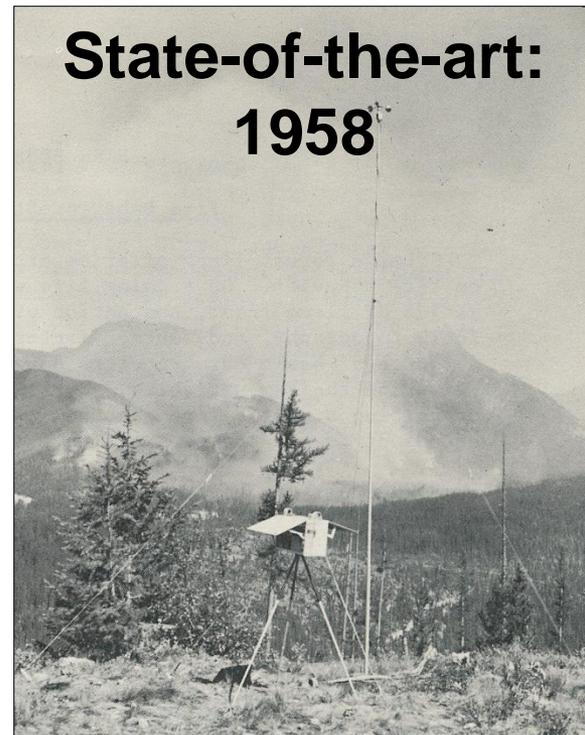


**What are the most the important things to observe and record during major fire activity?**

- **Position of head fire at selected times**
- **Wind speeds to match the fire spread intervals**
- **Representative photos (time, location & direction of view relative to fire)**

**As it turns out these are the most difficult to obtain!**

**Technological advances in photography, remote sensing and weather monitoring over the years has greatly facilitated matters. However, good representative or site-specific wind readings, for example, are still difficult to obtain.**

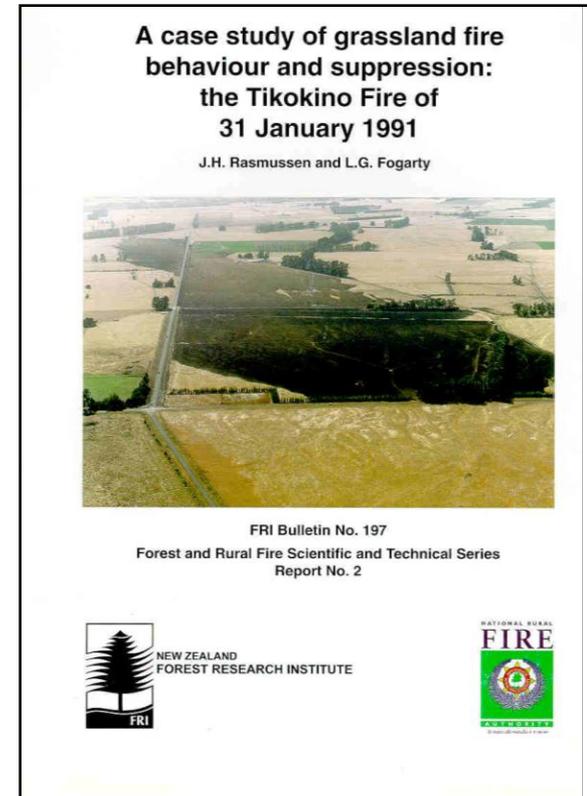


**Today: RAWS**

# Report Preparation and Documentation

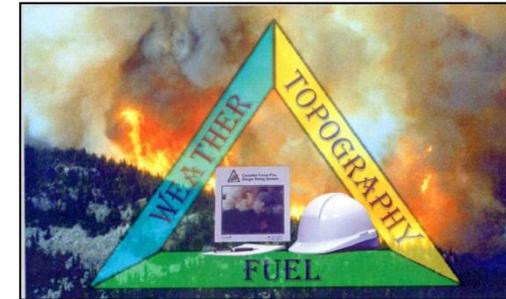
**After compiling all the information required to produce a case study report, one must then write it up.**

**The challenge is to distill the mass of information into a coherent summary.**



# Suggested Outline for Preparing a Case Study Report

- Introduction
- Chronology & Development
- Details of Fire Environment
- Analysis of Fire Behavior
- Conclusion



Other sections on fire effects or impacts on people (firefighters and the public), homes and ecosystems as well as more in-depth analyses of suppression strategy and tactics, including human factors.

# There is a great deal of variance in size of case study reports.

USDA United States Department of Agriculture  
Forest Service  
Rocky Mountain Research Station  
General Technical Report RMRS-GTR-114  
September 2003



## Hayman Fire Case Study

Russell T. Graham, Technical Editor

**~300 pages**



## Fire Technology Transfer Note

Number - 5

December 1994

### Wildfire Behaviour Case Study of the 1986 Awarua Wetlands Fire<sup>1</sup>

By H.G. Pearce, R.F. Morgan<sup>2</sup> and M.E. Alexander<sup>3</sup>

One might be quick to suspect that there is very little relationship between wetlands and wildland fires, yet many terrestrial plant communities in these ecosystems are exceedingly flammable in spite of the fact that they may be associated with mild fire climates. A case in point is a human-caused wildfire that occurred in wetlands associated with the Awarua Plains (elevation 1-9 MSL) some 17 km southeast of Invercargill on the South Island of New Zealand during the summer of 1986. The fire advanced some 7 km up progress (Fig. 2) was halted by power lines initially ignited the fire advanced some 7 km up progress (Fig. 2) was halted by barriers coupled with effective suppression action. Complete containment was achieved by noon the next day but the fire was not declared officially out until four days later. The final area burnt amounted to 1360 ha with a total perimeter length of 21.7 km. No lives were lost or structures destroyed (although 12 houses and other buildings were threatened) but the head of the fire came perilously close (to within 1.8 km) to an area containing rare and endangered flora (i.e., cushion bog or *Donatia* spp.); vegetation very quickly reclothed the fire area, albeit with some changes in relative abundance of individual species. The wetland vegetation provides habitat for the endangered fernbird (*Bowdleria punctata*). The other potential value-at-risk were the power lines leading to the nearby Comalco NZ aluminium smelter plant; a disruption in the power supply would have caused a financial calamity.

**5 pages**

The major run of the fire took place under moderately cool ambient temperatures (12-13°C), relatively high humidities (76-82% RH) and nearly overcast skies, but exceedingly strong surface winds (43-50 km/h) (Table 1) occurred as a result of an anticyclone to the west of New Zealand and an intense low pressure system southeast of the country (Fig. 3). The 1 p.m. NZDT upper air sounding at Invercargill revealed a region of drier air above 1600 m MSL (Fig. 4) and a "jet point" or wind maximum at 2200 m MSL (Fig. 5), although the shape and angle of the fire's smoke/convection column or plume typified that of a classic wind-driven conflagration.

<sup>1</sup> This Fire Technology Transfer Note (FTTN) is based largely on a poster paper entitled "Wildfire Behaviour in a New Zealand Wetland: A Case Study" as presented at the 19th Tall Timbers Fire Ecology Conference - FIRE IN WETLANDS: A MANAGEMENT PERSPECTIVE that was held from 3-6 November 1993 in Tallahassee, Florida. The text of this FTTN constitutes the abstract for the poster paper that will appear in the conference proceedings to be published early in 1995 by the Tall Timbers Research Station, Tallahassee, Florida. The capable assistance of L.G. Fogarty of the New Zealand Forest Research Institute in the preparation of this wildfire behaviour case study is gratefully acknowledged.

<sup>2</sup> Department of Conservation, Southland Conservancy, Invercargill, New Zealand.

<sup>3</sup> Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta.



# Example of a 1-(or 2-) pager: Cranbrook #6-1985 Fire, B.C.

## Cranbrook Fire IR #6, British Columbia, Canada

**Geographical Location:** 49°37.5' N, 115°37.3 W.

**Time/Date of Origin:** 1530 h MDT, July 8, 1985

**Fuels:** FBP System Fuel Type C-7, open ponderosa pine - Douglas-fir (15 m stand height & 3 m crown base height), cured grass and logging slash from partial cut.

**Topography:** flat, 900 m MSL

**Weather:** 1300 h MDT observations recorded at Cranbrook AES station (8km west of fire area, 939 m MSL) - Temp 33°C, RH 19%, 10-m winds 270° @ 18 km/h. Average wind speed during fire run (1530-1740 h MDT) 24 km/h.

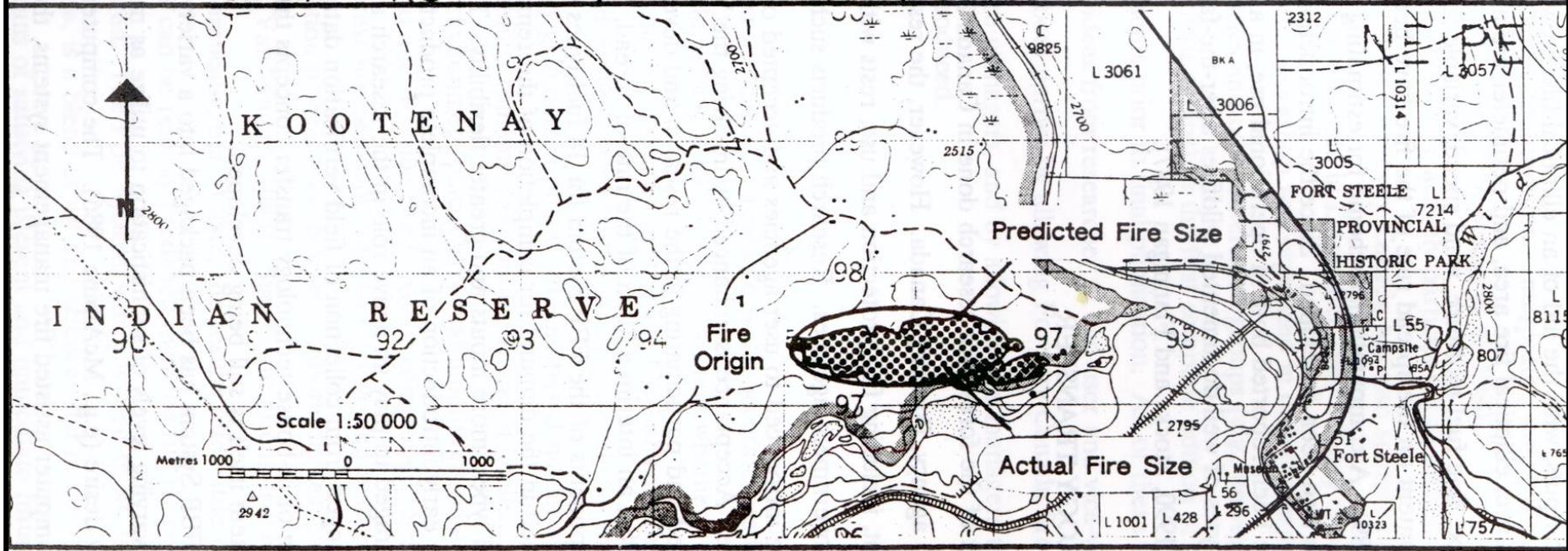
**FWI System:** FFMC 96, DMC 96, DC 487, ISI 33, BUI 129, FWI 76, (@ time of the fire).

**Fire Behavior:** Elapsed time since ignition and infrared mapping at 1740 h MDT - 130 min.

Parameter	Observed	Predicted
Head Fire ROS (m/min)	16.5	14.7
Fuel Consumption (kg/m <sup>2</sup> )	--	3.7
Head Fire Intensity (kW/m)	--	16,487
Type of Fire & Crown Fraction Burned (CFB)	continuous crown fire	continuous crown fire (CFB 0.94)
Total Spread Distance (m)	2,140 *	1,700
Fire Area (ha)	67	79
Fire Perimeter (m)	4,234	3,810
Elliptical L/B	2.29 **	2.87

\* Excluding the spot fires east of the river.

\*\* Reflects intensive suppression action along northern flank of fire from airtanker drops of chemical retardant.





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A **Case Study** is an exploration of a "bounded system" or a case over time through detailed, in-depth data collection involving multiple sources of information rich in context. (Creswell, 1998) A wildland fire subject area makes a particularly effective case study as is seen in the examples below.

Submit **your** case study document to the Lessons Learned Center Library (after you login as a registered member) and begin to add to the collection.

**Sections:** [High Reliability Organizing](#) [Fire Social Science](#) [Wildland Fire Incident Case Study](#) [Wilderness and Wildland Fire Use](#) [Wildland Firefighter Safety Awareness](#) [Wildland/Urban Interface](#) [Incident Management](#) [Fire Behavior](#) [Recent Submissions](#)

## High Reliability Organizing

[HRO Case Study: HRO Implementation on the Shoshone National Forest](#) (535KB pdf posted 03/17/2009) Personnel on the Shoshone National Forest mark 2006 as a bad year, but one that also demonstrated the Forest's commitment to resilience. On April 10th of that year, the Homestead Park II prescribed burn escaped control under adverse weather conditions, spreading onto private property and burning four cabins.

[Case Study: Incident Management Teams as Vehicles of HRO Implementation](#) (779 KB pdf posted 11/4/2008) In November 2007 Jason Greenlee, Fire Management Officer for the Bureau of Indian Affairs Navajo Office, contacted Anne Black, an interdisciplinary scientist working for the U.S. Forest Service, to inquire about her availability to conduct High Reliability Organizing (HRO) related training. In January 2008, five of the Southwest geographical area incident management teams approved the proposed HRO training as an element of their annual spring team meetings, and Black began the planning process by proposing content to the meeting organizers.

[High Reliability Organizing Implementation at Sequoia & Kings Canyon National Parks - An HRO Case Study](#) (833 Kb)

Wildland Fire  
Lessons Learned Center

# Fire Behaviour Knowledge Base



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## Related Links

- [Aviation and Forest Fire Management Branch](#)
- [Canadian Forest Services Natural Resources Canada](#)
- [Fire Management System Laboratory University of Toronto](#)
- [National Fuel Moisture Database](#)
- [If you would like your website to be added to our related links please click here and send us an email with your URL](#)
- [Developers Blog Archive](#)
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Welcome to the Fire Behaviour Knowledge Base Web Site. The FBKB is a Joint project of the Ontario Ministry of Natural Resources, the Canadian Forest Service and the University of Toronto.

The FBKB is a searchable database of wildland fire behaviour observations. The purpose is to allow Fire Behaviour analysts to describe a fuel complex, search through the observation database and review field fire behavior observations from similar fuel situations.

Users can also record their own observations of fire behaviour (fuels, weather, and resulting fire behavior) building their own private database, and then submit that back to us and we will then include it in the master data base. In that, way the master database continually grows and users can continually download updated versions, allowing access to the current state of the knowledge for fire behaviour prediction.

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# Recent examples

United States  
Department of  
Agriculture  
R5-TP-025  
August 2007

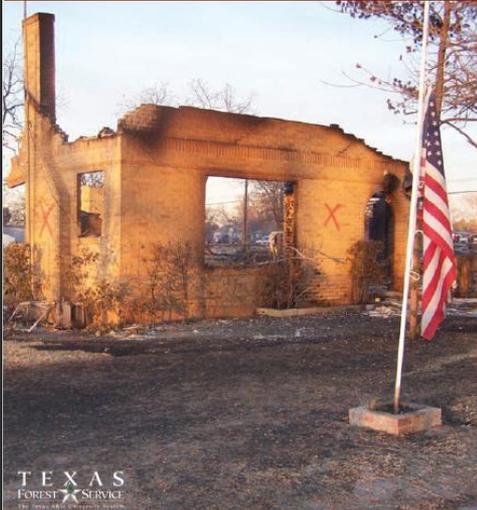


**An Assessment of Fuel Treatment Effects on Fire Behavior, Suppression Effectiveness, and Structure Ignition on the Angora Fire**





**Cross Plains, Texas  
Wildland Fire Case Study**



TEXAS  
FOREST SERVICE  
THE TEXAS A&M UNIVERSITY SYSTEM

**Antelope Complex  
Fire Behavior Assessment Report**



*fire burning across site 2 at night*

Prepared 7/14/2007  
Fire Behavior Assessment Team

Jo Ann Felix, Team Leader/Technical Specialist  
Mike Campbell, Operational Lead/Technical Specialist  
Alicia Reiner, Technical Specialist  
Todd Decker, Technical Specialist  
Carol Ewell, Technical Specialist  
Gail Seiskay, Technical Specialist

7/21/2007 Fire Behavior Assessment Team

**Fourmile Canyon Fire  
Preliminary Findings**

U.S. Department of Agriculture Forest Service  
Rocky Mountain Research Station  
Revised October 12, 2011

Fourmile Canyon Fire Assessment Team  
Leader: Russell Graham  
Fire Behavior: Mark Finney, Chuck McHugh  
Home Destruction: Jack Cohen, Rick Stratton  
Fire Weather: Larry Bradshaw, Ned Nikolov  
Economics/Social: Dave Calkin



Photo Credit: John Leyba, Denver Post

NIST Technical Note 1635

**A Case Study of a Community  
Affected by the Witch and Guejito  
Fires**

Alexander Maranghides  
William Mell



**NIST** National Institute of Standards and Technology • U.S. Department of Commerce

**“We are just too busy to do case studies.”**

*Two decades ago, when the U.S. Weather Bureau was considerably poorer than today's National Weather Service, fire weather forecasters used to spend part of their winters analyzing and documented their past seasons fires with the aim of providing better localized service. I haven't seen any such analyses lately ... I suppose because of "higher priorities" elsewhere. **I suggest we reexamine our priorities.***



Craig C. Chandler  
USFS Fire Research Director

# Is a permanent, dedicated group a possibility?

## A CASE FOR WILDLAND FIRE BEHAVIOR RESEARCH UNITS

### THE STAFF RIDE APPROACH TO WILDLAND FIRE BEHAVIOR AND FIREFIGHTER SAFETY AWARENESS TRAINING: A COMMENTARY

Martin E. Alexander

I felt very fortunate to have been able to participate in all three phases of the Dude Fire Staff Ride that took place on March 3-5, 1999. Like the other staff ride participants, I found the whole experience to be extremely beneficial to my gaining a deeper understanding of the complexities involved in fire behavior and the associated firefighter fatalities resulting from the major run of the Dude Fire on the afternoon of June 26, 1990.

I am thus greatly honored to have been asked to contribute this essay for the special issue of *Fire Management Today* dealing with the Dude Fire Staff Ride. I sincerely hope that the comments offered here, based in part on the Dude Fire Staff Ride experience coupled with a 30-year career in wildland fire, will lead to enhancements as well as extensions of the staff ride concept in the future for training fire behavior analysts (FEANs) and in further developing firefighter safety awareness training.

#### Strengths and Limitations

Prior to the Dude Fire Staff Ride, I had only a superficial appreciation for this incident based on bits and pieces of information gleaned from

My experience on the Dude Fire Staff Ride suggests that the wildland fire community has an excellent opportunity to develop its own unique staff ride tool.

various sources over the years (e.g., Campbell 1995; Gleason 1991; Goens and Andrews 1998; Johns 1996; Mangin 1996; MTDC 1990; NPFS 1998a; NFPA 1990; Putnam 1995a; Rosato 1991; Rothermel 1991), including the official accident investigation report (USDA Forest Service 1990), and a conversation I had with Dude Fire veteran Paul Gleason in Missoula, MT, in June 1994.

Although the wildland fire community's adaptation of the military staff ride (Robertson 1987) concept provides a powerful learning technique, we need to recognize that it isn't necessarily a cure-all for increasing wildland firefighter safety awareness. Instead, it is just another tool in our toolkit. Nonetheless, my experience on the Dude Fire Staff Ride suggests that the wildland fire community has an

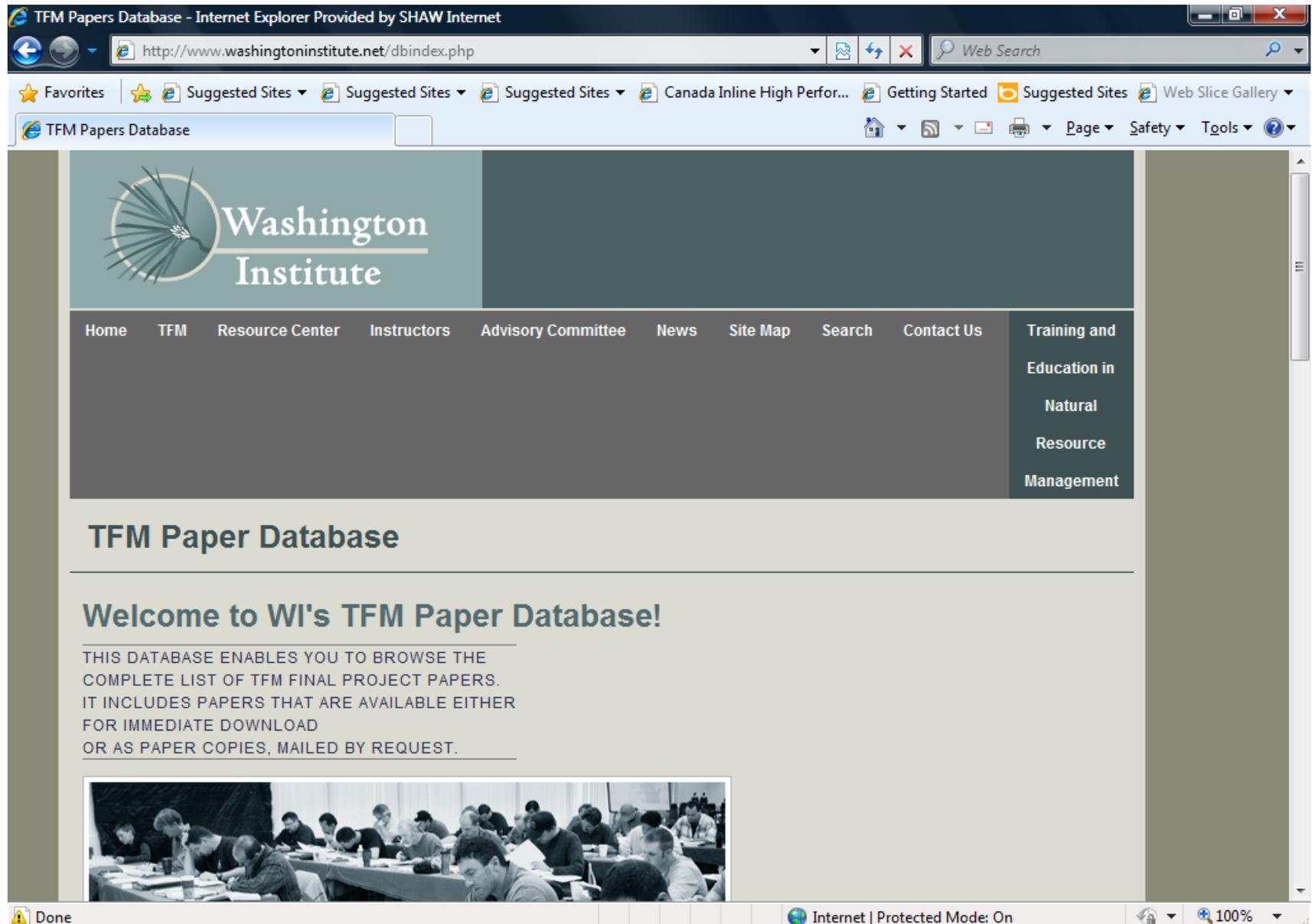


Participants in the Dude Fire Staff Ride at the fire shelter deployment site. Photo: C3214 Forest Service, Missoula Technology Development Center, Missoula, MT, 1999.

the recognition of the human dimensionality incidents (Braun and Latapie recent case histories (e.g., Maclean vividly recall the daylong presentation of California Department of Forestry Fire case histories given at the Forest AB, in the mid-1980s. His case the importance of human factors as contributing factors.

## Alexander (2002)

# Case Study as a TFM Final Project Paper?



The screenshot shows a web browser window with the following elements:

- Browser Title Bar:** TFM Papers Database - Internet Explorer Provided by SHAW Internet
- Address Bar:** http://www.washingtoninstitute.net/dbindex.php
- Navigation Bar:** Includes "Favorites", "Suggested Sites", "Canada Inline High Perfor...", "Getting Started", and "Web Slice Gallery".
- Logo:** Washington Institute logo featuring a stylized fan or leaf design.
- Navigation Menu:** Home, TFM, Resource Center, Instructors, Advisory Committee, News, Site Map, Search, Contact Us, and a dropdown menu for "Training and Education in Natural Resource Management".
- Section Header:** TFM Paper Database
- Text:** Welcome to WI's TFM Paper Database!  
THIS DATABASE ENABLES YOU TO BROWSE THE COMPLETE LIST OF TFM FINAL PROJECT PAPERS. IT INCLUDES PAPERS THAT ARE AVAILABLE EITHER FOR IMMEDIATE DOWNLOAD OR AS PAPER COPIES, MAILED BY REQUEST.
- Image:** A black and white photograph of a group of people sitting at long tables in a classroom or meeting room, looking at papers.
- System Tray:** Shows "Done", "Internet | Protected Mode: On", and "100%" zoom level.



# Learning & Fire Behavior Expertise



**Best scenario is a combination of: (1) additional field experience, (2) increased modelling proficiency and (3) case study knowledge.**

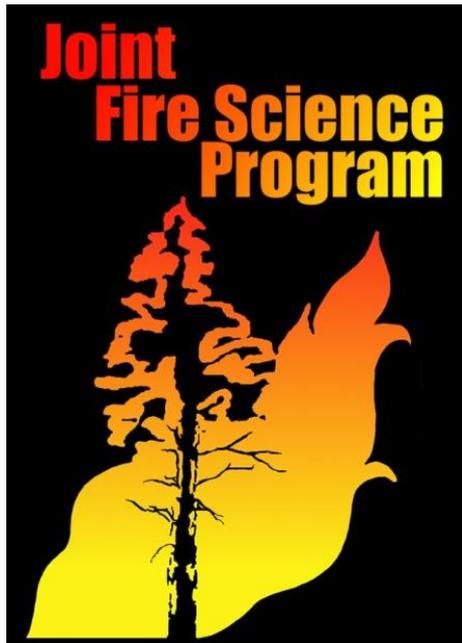
**Our fire management culture has become dominated by a learning pattern of trial and error. If the systematic study of the past through the use of case studies could become a routine procedure – we could be become a true learning culture.**

# Take-home Messages

- **Seek to learn more about the case study method.**
- **Consider how you might best considering doing a case study in your position.**
- **Encourage your colleagues and co-workers to consider doing a case study.**
- **Make it a personal goal to try and complete a case study every year.**
- **Recognize that regardless of what field of wildland fire you are in, that the understanding of wildland fire behavior is key to safe and effectiveness control or use of planned or accidental fires.**

# Acknowledgement

**This is a contribution of Joint Fire Science Program  
Project JFSP 09-S-03-1**



**Crown fire behavior  
characteristics and  
prediction in conifer forests:  
A state of knowledge  
synthesis**

<http://www.fs.fed.us/wwetac/projects/alexander.html>

**mea2@telus.net**

## Suggested Reading

Alexander, M.E. 2002. The staff ride approach to wildland fire behavior and firefighter safety. *Fire Management Today* 62(4): 25-30.

Alexander, M.E. 2009. The 1988 fires of Yellowstone and beyond as a wildland fire behavior case study. USDA For. Serv., Wildland Fire Lessons Learned Cent., Tucson, AZ. 30 p. [[www.wildfirelessons.net/documents/Alexander\\_Yellowstone88\\_FB.pdf](http://www.wildfirelessons.net/documents/Alexander_Yellowstone88_FB.pdf)]

Alexander, M.E.; Thomas, D.A. 2003. Wildland fire behavior case studies and analyses: Value, approaches, and practical uses. *Fire Management Today* 63(3): 4-8.

Alexander, M.E.; Thomas, D.A. 2003. Wildland fire behavior case studies and analyses: Other examples, methods, reporting standards, and some practical advice. *Fire Management Today* 63(4): 4-12.

Alexander, M.E.; Thomas, D.A. 2006. Prescribed fire case studies, decision aids, and planning guides. *Fire Management Today* 66(1): 5-20.

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