

**INFORMATION FROM MARMOT  
CREEK BASIN:  
STILL MAKING WAVES AFTER HALF  
A CENTURY**

**Kananaskis, 21-22 Feb. 2013**

**J. P. (Jim) Bruce**



Marmot





CANADA

DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES  
WATER RESOURCES BRANCH

PROCEEDINGS  
OF  
SYMPOSIUM No. 1

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SPILLWAY DESIGN FLOODS

Held under the auspices of  
NATIONAL RESEARCH COUNCIL OF CANADA  
ASSOCIATE COMMITTEE ON GEODESY AND GEOPHYSICS  
SUBCOMMITTEE ON HYDROLOGY  
at  
OTTAWA  
on  
4 & 5 NOVEMBER 1959





# MUNN AND STORR

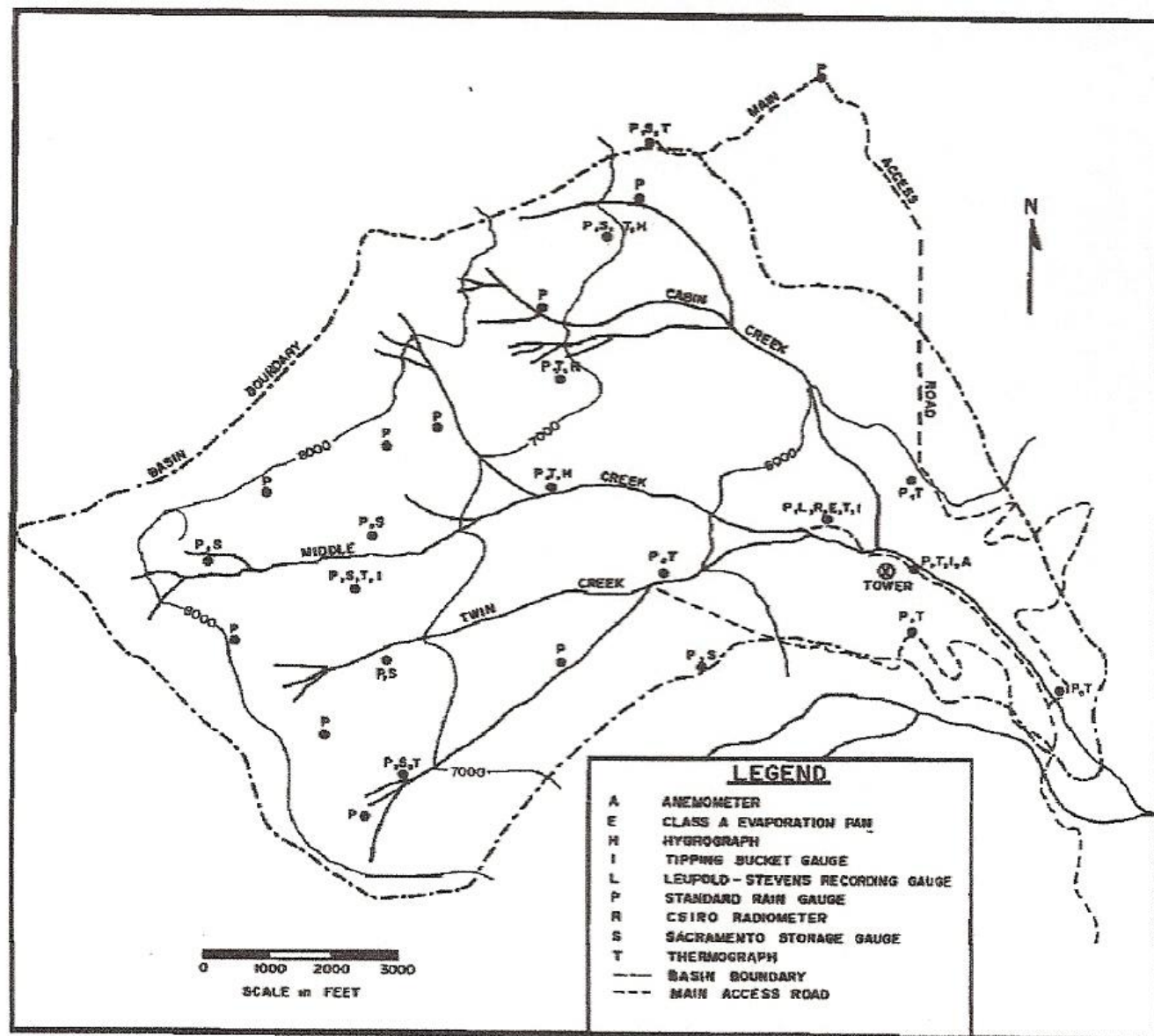


Fig. 1. The Marmot Creek Watershed.



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**J.P. Bruce M.A. R.H. Clark M.Eng.**

# Introduction to **HYDROMETEOROLOGY**

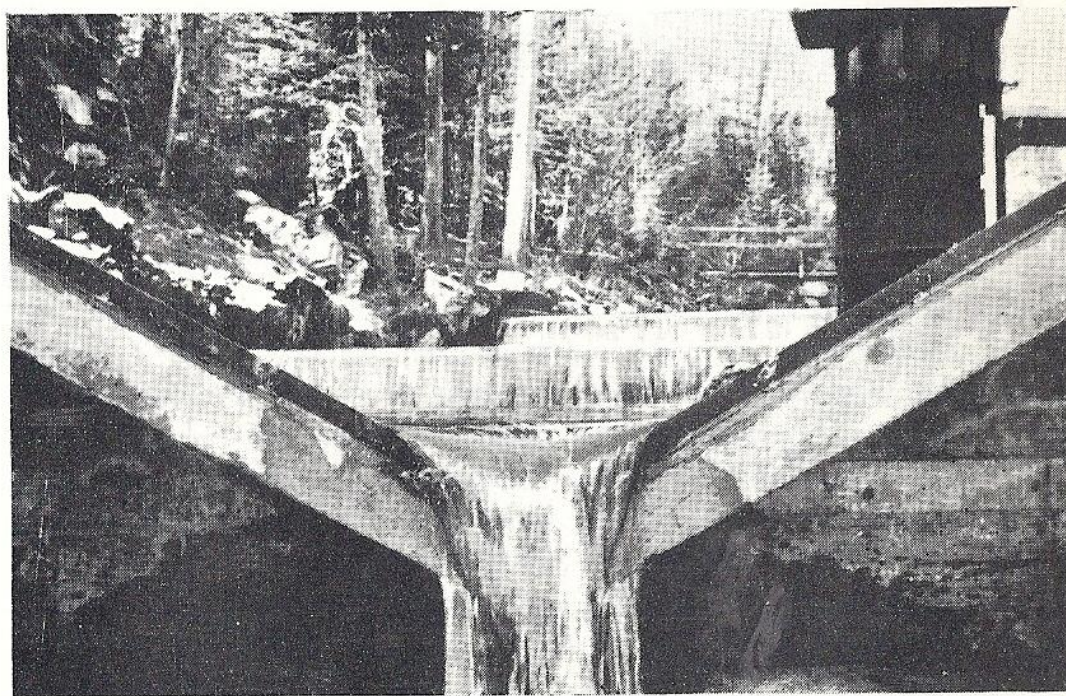


FIG. 6.14. 120° V-notch weir and recorder installation on Marmot Creek near Kananaskis, Alta. (Courtesy Water Resources Branch, Canada.)



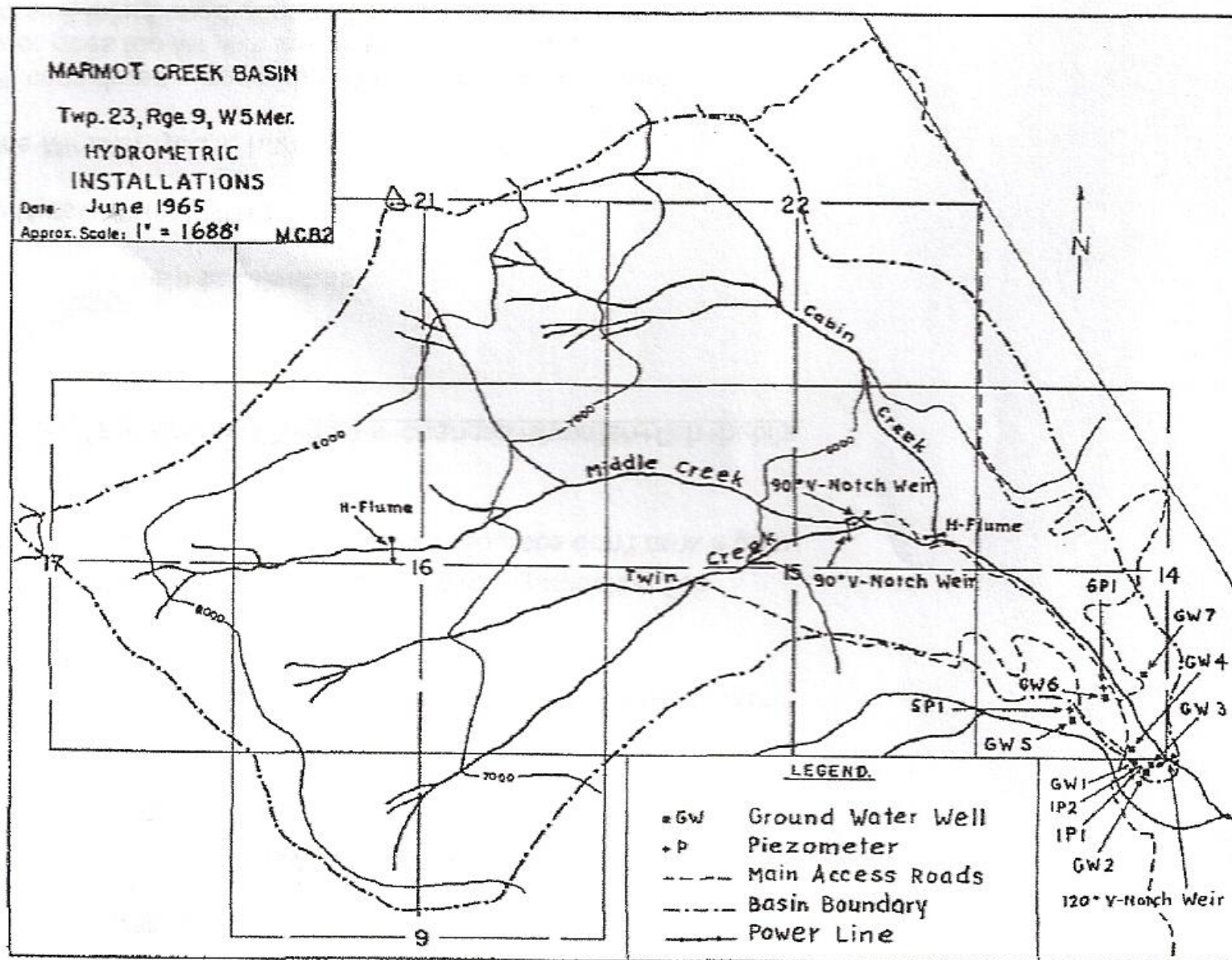


Figure 2 - Map of Marmot Creek Basin showing the three sub-basins and the surface water and groundwater instrumentation installed up to June, 1965.

SCIENCE SECRETARIAT



**Special Study No. 5**

# **Water Resources Research in Canada**

by J. P. Bruce and D. E. L. Maasland

with a Special Report on  
The Contribution of Social Science Research  
to Water Resource Management in Canada

by W. R. Derrick Sewell



8 THE GLOBE AND MAIL, TUESDAY, OCTOBER 1, 1968

*Involvement of industry, universities stressed*

# Science Council advocates surge of spending, research on water resources

By DAVID SPURGEON

The Science Council of Canada yesterday released proposals for a major new national program of water resources research.

In its third published report, the Federal Government's scientific advisory body call for large increases in water research expenditures, coordination of research, greater involvement of industry and establishment of university water research centres.

- 1: Kejimikujik, N.S.
- 2: Turkey Lake, Ont.
- 3: Bad Lake. Sask.
- 4: Marmot Lake, Alta.
- 5: Carnation Creek, B.C.











**Fig. 4.** View (looking down the basin) of the clearing near the 80-foot tower site.



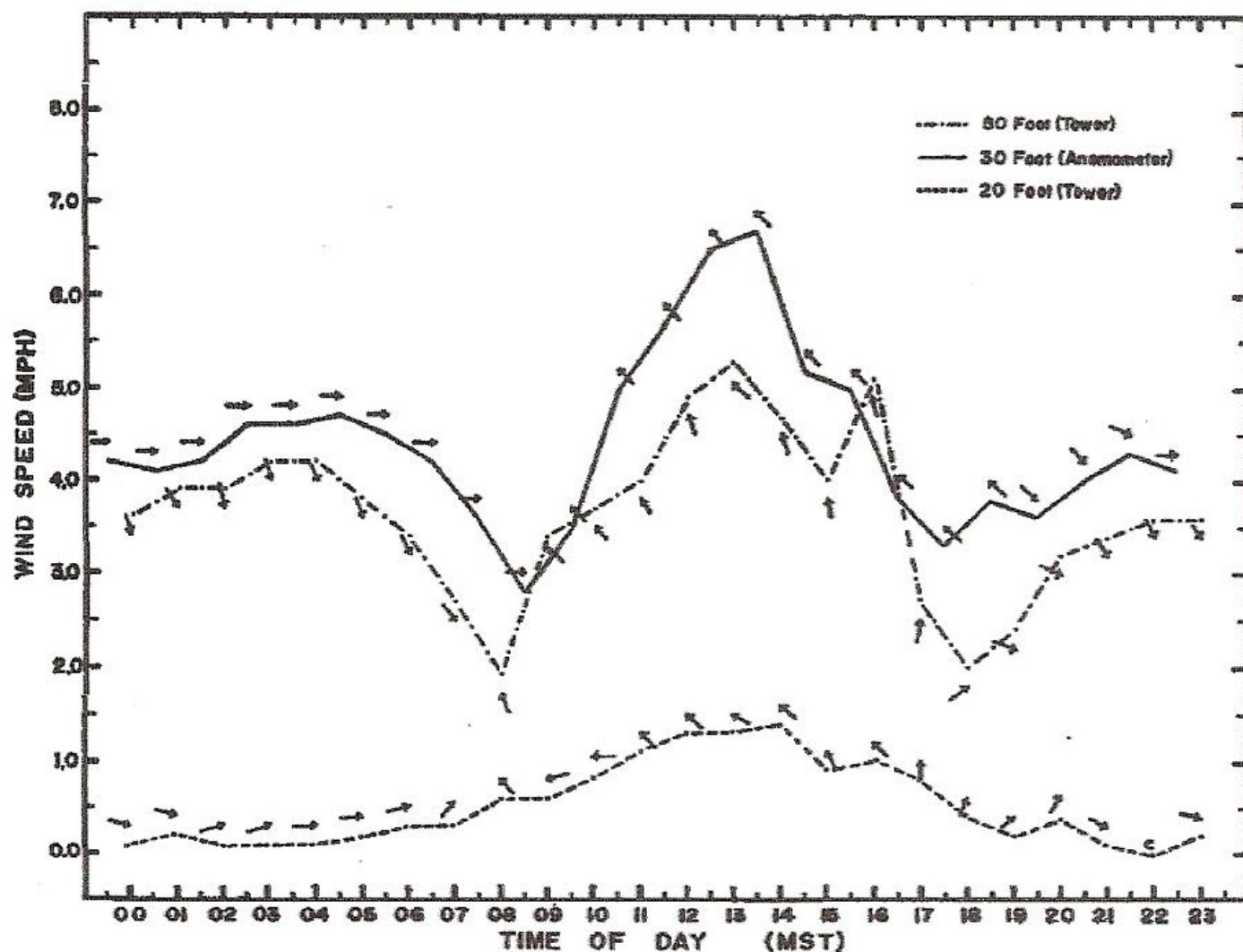


Fig. 5. Average winds from 80-foot tower in forest at Marmot Creek for complete period of record August 11-27, 1965, and from 30-foot MSC anemometer in the clearing for the same period.

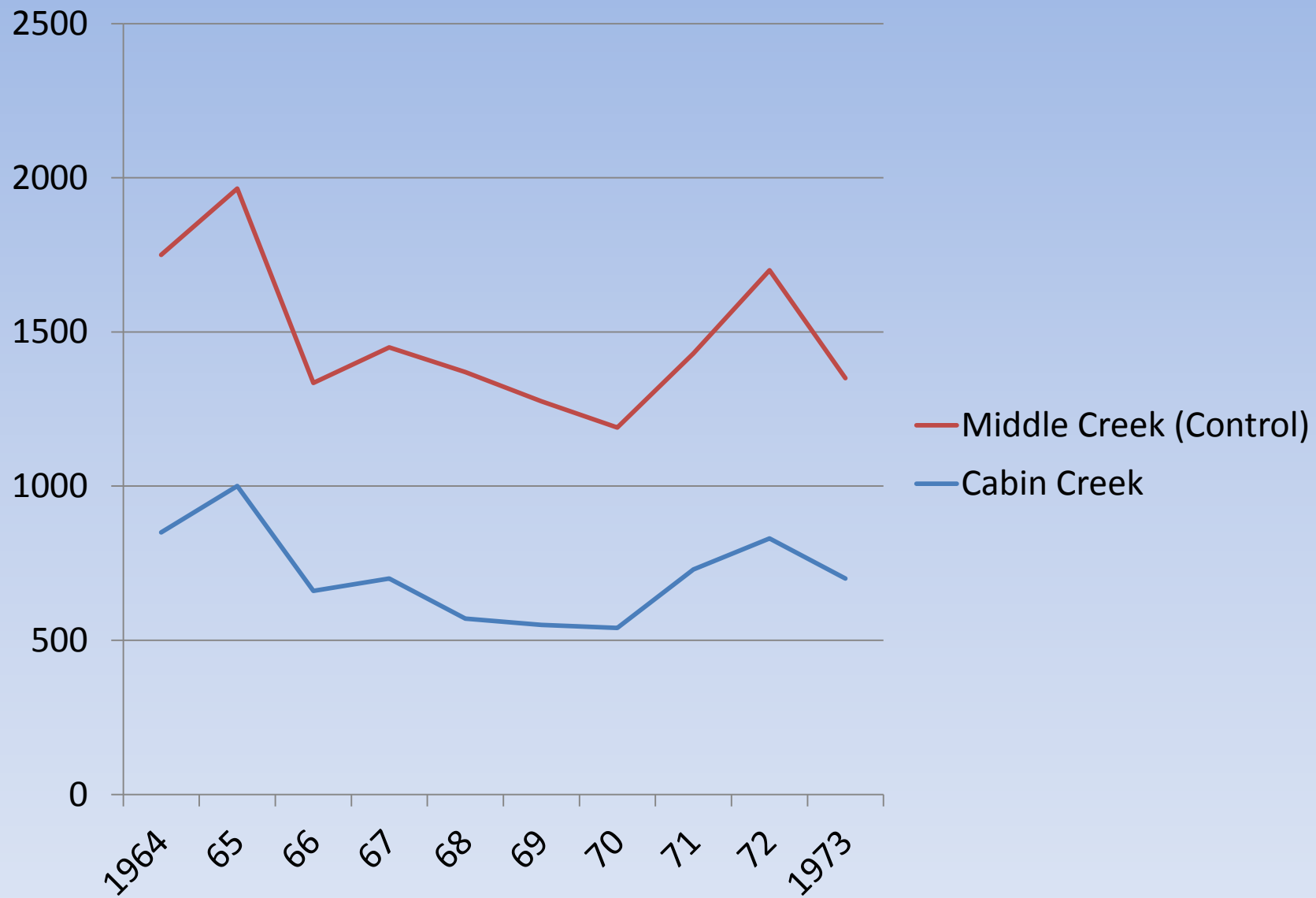
## **An Investigation of Turbulence Within the Forest**

GORDON A. McBEAN<sup>1</sup>

*Meteorological Service of Canada, Toronto*

(Manuscript received 26 October 1967, in revised form 4 March 1968)





# **SOUTHERN ALBERTA OBSERVED TRENDS**

**BY 2050 (from 2010)**

<b><u>Temperature °C (1950-2007)</u></b>			
	<b>Max. °C</b>	<b>Min. °C</b>	<b>°C</b>
Annual	1.5 to 2.5	0.5 to 1.5	2 to 4
Winter	2.5 to 3	1.5 to 3	3 to 4
Spring	2.5 to 3	2.5 to 2.5	2 to 4
Summer	0.5 to 2.5	-0.5 to 1.5	2 to 3
Autumn	-0.5 to 0.5	-1.5 to 0.5	2 to 3

<b><u>Ratio of Snow to Total Precipitation</u></b>			
	<b>(1950-2003)</b>	<b>%</b>	<b>%</b>
Annual	-20 to -5		-15
Winter	0 to 3		-10
Spring	-20 to 0		-20
Autumn	-5 to 0		-10

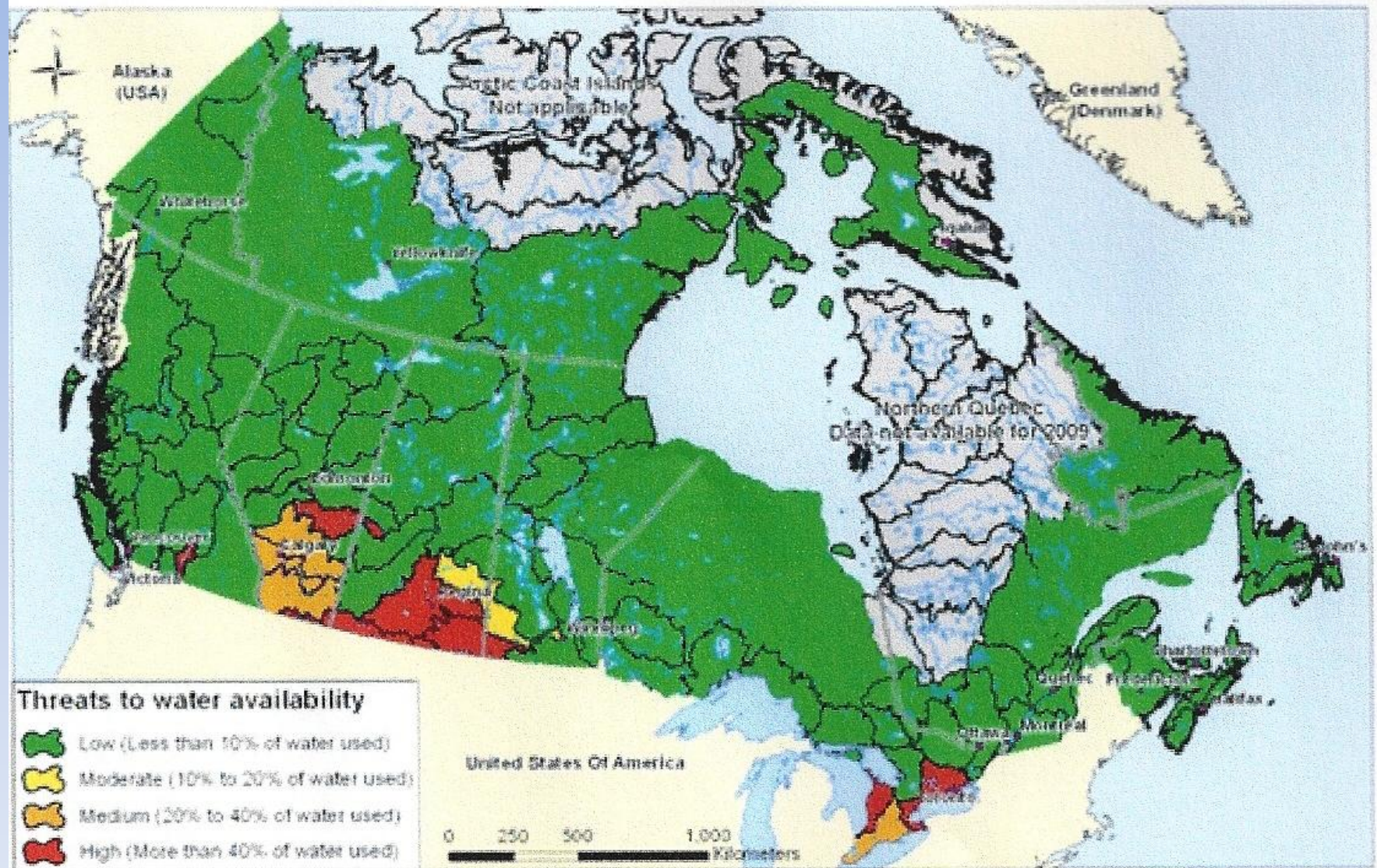
<b><u>Streamflow (1967-1996)</u></b>			
		<b>%</b>	<b>%</b>
Annual	-10 to -20		-5 to -15
Minimum Daily	-30 to 20		-10 to -20
Maximum Daily	-20 to -10		0

By 2050 Estimated Annual Losses: (*Pietroniro, et al., 2006*)

Red River (at Bindloss)	13%
Bow River	10%
South Saskatchewan (at Lake Diefenbaker)	8 ½ %



**Figure 5: Water Availability Indicator for 2009**



**There are three important lessons to be drawn from the Marmot Creek experience. They are:**

- 1. Hydrometeorological measurement systems must be maintained – they increase in value with age,**
- 2. Co-ordinated multi-disciplinary monitoring and research are critical to understanding and predicting the behaviour of natural systems,**
- 3. Water users in the South Saskatchewan system must plan to adapt to reduced water availability.**