SCIENTIFIC SERVICES DIVISION

REPORT

A SUMMARY OF THE HEAVY RAINFALLS OVER BRITISH COLUMBIA DURING THE MONTHS OF MAY AND JUNE 1990

Bob Beal
Scientific Services Division
Atmospheric Environment Service
Pacific Region

October, 1990
Report PAES-90-5

A SUMMARY OF THE HEAVY RAINFALLS OVER BRITISH COLUMBIA DURING THE MONTHS OF MAY AND JUNE 1990

Bob Beal
Scientific Services Division
Atmospheric Environment Service
Pacific Region

October, 1990

INTRODUCTION

British Columbia experienced two consecutive very wet months, May and June of 1990. The heavy rains, combined with Spring Runoff, resulted in washouts, mud slides and severe flooding in many parts of the province.

This report gives a brief overview of the general meteorological conditions and uses rainfall data, that has been quality controlled, to describe the storm rainfalls during May and June of 1990. The report highlights areas of heavy rainfall and is intended to serve as a background for any future, in-depth, study or analysis that might be undertaken.

GENERAL METEOROLOGICAL SITUATION

For most of May an offshore ridge of high pressure maintained a fairly moist northwesterly flow over most of British Columbia. Conditions were generally unsettled with showery precipitation.

Towards the end of May (about the 22nd) the first of three vigorous "cold" low pressure systems arrived just off the Washington coast. Each system gradually drifted inland, weakened, and was replaced a few days later with another system. The last one, for May, moved onto the coast on May 30th. Each system generated a moist southerly flow of air over the southern interior. Then as associated frontal systems moved across the interior, numerous heavy instability rainfall events were triggered. Parts of the south coast also received significant amounts of rain.

The parade of "cold" lows continued into June, giving rise again to heavy rainfalls in many localities. During the first 10 days of June, four "cold" lows migrated eastward across the province. The last "cold" low of this series culminated in the exceptional heavy rains across the interior which ended on about June 12th. As in the previous month, portions of the south coast also received substantial rain.

After the last "cold" low dissipated, a ridge of high pressure developed over B.C., producing relatively dry conditions across the province. However, on June 20th a major low pressure disturbance from the Pacific entered the Gulf of Alaska which produced substantial rain for north coastal areas.

Yet another "cold" low system stationed itself off Vancouver Island on June 25th, again generating a moist southerly flow over the province. Near the end of the month (June) an associated frontal disturbance triggered heavy rainshowers over northern B.C. and brought rain to the North Coast.

SUMMARY OF HEAVY RAINFALL EVENTS

To illustrate the overall rainfall pattern, Tables I(a) to III(b) list the daily rainfall amounts for Principal Synoptic Observing Stations (usually located at airports) in British Columbia from May 15th to June 30th. A rough estimate may be easily obtained as to the approximate areas which received heavy rainfall and over which days. Five significant precipitation periods, associated with the frontal disturbances from the "cold" lows, immediately stand out:

1. May 22 to 25, 1990.

Here a cold low intensified and produced a very moist southerly flow, originating off the Baja Peninsula, over the interior. As the associated frontal system moved inland, thunderstorms were triggered over the central interior. Two funnel clouds and several heavy thundershowers were reported west of Prince George. The southern interior also received substantial rainfall. The rainfall from this single system exceeded the normal monthly May rainfall at several locations. Penticton (Airport) had 38.6 mm (millimetres) of rain from the 22nd to the 24th (normal monthly May total is 29.1 mm). Cranbrook (Airport) was surprised with 46.3 mm from the 23rd to the 25th, while the normal monthly total for May is only 43.0 mm.

2. May 29 to June 4, 1990.

Due to another cold low, clouds embedded in an easterly circulation about the low pressure centre generated significant rainfalls over southern B.C. At Castlegar 30.4 mm of rain fell, May 29th, which broke the record daily precipitation amount of 27.2 mm set in May of 1970. By the end of May, Penticton had a record breaking monthly total of 86.4 mm. The Lower Mainland and Victoria received about 20 mm of rain, while the Vancouver Airport had 29 mm on May 31st.

On the morning of June 3rd a frontal system traversed the B.C. coast which generated significant rainfalls for the inner south coast. Squamish Airport had 52.6 mm for June 2-3, while nearly 44 mm fell at Abbottsford on June 3rd. As the system crossed into the interior, Kelowna received almost 21 mm and about 27 mm was recorded at Smithers on June 3rd.

3. June 10 to June 12, 1990.

A major "cold" low system entered the southern interior on June 10th and moved into central Alberta on June 11th. The heaviest rains, in the southern interior, occurred along a frontal zone just in advance of the "cold" low. Both Kelowna and Penticton received about 30 mm of rain on June 10th. In the central Interior the heaviest rain occurred in the northeasterly return circulation about the low as it moved into Alberta. For example, Prince George received 26.5 mm and Dawson Creek an incredible 75.2 mm on June 11th.

Because this event culminated in a number of major mudslides, severe flooding and washouts, the rainfall distribution is further elaborated upon in the next section.

4. June 20 to June 21, 1990.

A very deep low pressure disturbance (988 millibars) tracked into the northern Gulf of Alaska on the morning of June 20th and drove an active warm front across the Queen Charlotte Islands and the Northern Mainland the following day. As a result, Prince Rupert received 56 mm (June 20-21) of rain with 27 mm falling in just 6 hours. Green Island Lightstation received the greatest one day amount with 67.0 mm.

5. June 27 to June 30, 1990.

An "cold" low pressure system approached Vancouver Island on June 27th. An associated trough of low pressure drifted eastward and produced 70 mm of rain on June 27th at Egg Island Lightstation and 42.2 mm at Addenbroke Island. Other stations along the central coast and over northern Vancouver Island received between 20 and 30 mm of rain. At the end of June new monthly rainfall records were established at Kelowna (102.5 mm) and at Penticton (87.8 mm).

Some additional weather-related information of interest, during the above periods, is tabulated in Table V.

THE JUNE 10 to 12, 1990 RAINSTORM

Impacts/damage

Before describing the actual precipitation distribution, it is of interest to briefly examine some of the damage that resulted during this period. In total the flooding claimed 9 lives and caused nearly 10 million dollars damage. The following information was extracted from two newspapers, The Vancouver Sun (June 13 and 14, 1990) and The Province (June 14 and 15, 1990), and from the Prince George and Fort Nelson Weather Offices which obtained some reports from local newspapers.

- Highway 97A from Sicamous to Grindrod was closed by a mudslide. The road from Enderby to Mabel Lake was washed out. Forty one people were evacuated, June 12th, by helicopter because of flooding in the Fall Creek area (16 km east of Enderby).

- In the Joe Rich Creek subdivision 50 people were evacuated to Kelowna, also a massive mudslide occurred in the area (June 12th).

- A major mudslide, 6 pm June 13th, closed the Trans-Canada Highway west of Revelstoke.

- Two people died near Vavenby. The deaths were blamed on a mudslide.

- A van went off a washed-out bridge over George Creek at about 10:30 pm on June 11th (about 150 km southeast of Prince George).

- A mudslide near McBride on June 11th, was followed by two others at the same location on June 14th. The last slide destroyed one house, damaged another, and cut the road and power to dozens of families.

- Near Hixon, June 12th, Stone Creek washed out about 300 feet of Highway 97.

- Dawson Creek suffered considerable damage. Side roads were devastated, main highways were water covered, and a creek virtually cut the city of Dawson Creek in two.

Rainfall Extent, Amounts, and Duration

The above reports of damage coincide, roughly, with the areas subjected to substantial rainfall for the period June 8th to the 12th. Thus the heavy rains were likely a contributing factor for the damages. Figures 1 and 2 provide an overview of the storm rainfall and graphically illustrate the areas which received substantial rainfall. Ladner Creek, in the southwestern corner of the Interior received 127.3 from June 8 to 12th. Around Joe Rich Creek and Summerland a rainfall maximum occurred with total precipitation amounts of the order of 60 mm. Moving somewhat further north, some localities in the Enderby-Sicamous area received amounts in the 70 to 90 mm range. The heavy rainfall also extended northward somewhat over the Shuswap Lake area and eastward towards the Rogers Pass.

For the central Interior, a significant rainfall maximum occurred around the McBride-Barkerville region with amounts likely in the 100 mm range. Another centre of maximum rain was located around the Fort St. John, Dawson Creek and Tumbler Ridge areas.

It should be stressed that because of the localized nature of convective storm rainfall, the complex topography and the relative sparsity of the observing network, there may well be

areas which received more or less rain than indicated on Figures 1 and 2.

Figures 1 and 2 were prepared using the rainfall data from the Principal Synoptic Observing Stations and selected Climate Stations, see Table IV. With a few exceptions, it is evident from Table IV that the bulk of the rain fell between June 9th and June 12th.

The heavy rainfalls basically stretched from the Okanagan northwards to 100 Mile House, Prince George and then towards Dawson Creek, and also extended eastward to Revelstoke and McBride.

Probable Recurrence Estimates

Using the two consecutive days giving the greatest rainfall amounts within the period June 8th to June 13th, the probable recurrence estimates were calculated for selected observing stations. The return period estimates[1] are given in Table IV. These estimates were calculated using the Gumbel method of moments[2].

There is considerable variation in the return periods computed for the stations. However, it appears that the heavy rainfall near Summerland and Joe Rich Creek was rather unusual in that the return period for the Climate Station Summerland CDA is nearly 70 years. The return period of almost 32 years for Vavenby also stands out. An exceptional large return period was computed for McBride North, 585 years! This figure should be viewed with caution. But the storm total amount of 115 mm is likely correct as it is based upon a recording rain gauge at the Climate Station. For most of the stations, with a few exceptions, the two day return periods are less than 10 years. Within the peak rainfall areas, the return periods varied considerably and a rough estimate would be from 20 to 100 years.

SUMMARY

The months of May and June, 1990, were exceptionally wet for many localities in the British Columbia Interior due to a successive number of heavy rainfall events from about May 15th to June 30th. The rainfall was mostly caused by a rather long series of "cold" low pressure systems which brought considerably moisture into the interior regions with very unstable atmospheric conditions. The most outstanding rainstorm took place between June 10th to the 12th as it coincided with severe flooding, washouts and mudslides in the Interior.

---

[1] The statistical method used can not provide a direct estimate of the return period of the observed amounts. In this report, a return period of X years should be taken to mean that the precipitation observed was the same as the a priori X year precipitation amount expected for that location.

[2] Pugsley, W.I., 1981: Flood Hydrology Guide for Canada: Hydrometeorological Design Techniques. Canadian Climate Centre Report, Downsview, Ontario, 102pp.

This Page Intentionally Left Blank

TABLE I(a) NORTH AND SOUTH B.C. COAST

The 24-Hour Rainfall Amounts[1], in millimeters, from the Principal Synoptic Observation Stations for the period from May 15, 1990, until May 31, 1990.

May 1990	Hope A.	Abbots-ford A.	Van-couver A.	Vic-toria A.	Comox A.	Port Hardy A.	Cape Scott	Cape St. James	Sand-spit A.	Prince Rupert A.	Ter-race A.
15	TR					TR		TR	TR		
16					TR		.2	1.0	1.3	TR	
17	TR	TR		6.0	TR						
18	4.0	2.6	1.0	.2			TR	TR		TR	
19							1.7	1.5	1.5	TR	
20	14.6	5.2	5.8	2.4	2.3	TR	1.6	.4	TR	.4	10.2
21	.6	3.8	1.8	3.2	7.6	.6	1.2			12.0	23.6
22	1.8	1.4	4.6	.6	7.8	.3	4.1	1.5		1.6	.6
23	.2	TR	.2	.2	TR				2.8	.5	TR
24	2.7	1.4			TR						
25	.8	TR				TR		TR			
26	.2	TR	.2	1.0	6.3	TR	6.4	5.8	3.8	TR	3.0
27	TR	3.4	3.2	.6	10.9	1.0	4.5	12.0	8.9	1.4	2.2
28	3.5	TR			.2			.2		3.3	2.0
29	1.5	5.4		TR	TR	.6	1.3	3.8	.7	TR	TR
30	.2	.4			.2	.2	5.9	.6	TR		
31	21.1	19.8	29.0	21.2	1.5						

- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimetres) of precipitation.
- A. stands for Airport.

[1] The daily rainfall amounts in all the tables have been quality controlled by Climate Services, Pacific Region.

TABLE I(b) NORTH AND SOUTH B.C. COAST

Quality Controlled 24-Hour Rainfall Amounts, in millimeters, from the Principal Synoptic Observation Stations for the period from June 1, 1990, until June 30, 1990.

June 1990	Hope A.	Abbots-ford A.	Van-couver A.	Vic-toria A.	Comox A.	Port Hardy A.	Cape Scott	Cape St. James	Sand-spit A.	Prince Rupert A.	Ter-race A.
01	2.8	5.4	2.2	2.6	1.0	TR	TR	.2			
02	.2	4.2	3.6	3.6	11.2	11.8	19.8	8.9	16.2	7.2	2.4
03	21.1	43.6	21.5	13.4	15.2	9.8	1.3	1.8	TR	4.4	13.6
04	14.0	10.6	7.8	6.1	2.4	4.6	.9	TR			TR
05	.4	2.0	TR	.6				TR	TR		
06	11.8	20.0	22.6	3.4	7.6	1.6	2.9	2.4			
07	4.2	3.2	.8	.4	TR	TR	3.5	.4	TR	.2	
08	1.5	6.6	7.2	2.2	9.6	11.0	7.1	10.0	5.9	TR	TR
09	7.3	14.6	18.4	5.2	8.4						
10	14.2	10.1	15.6	1.4	16.6	30.2	.3				
11	15.4	5.2	.6	TR	4.1	2.0	2.3	1.0	.8	TR	TR
12	19.8	3.8	TR	2.4	TR	1.8	.6	1.0	.4	.8	.8
13	1.8										
14								1.0	1.8	.2	
15						TR	.9		TR	3.1	TR
16	TR		TR								TR
17							.4	1.6	4.2	1.7	.8
18	TR				TR	2.1	5.9	1.2	2.0	2.3	.2
19	4.3	TR			TR	.2	3.5		3.2	13.0	.4
20					TR	TR	1.6	4.1	1.0	17.6	1.4
21						TR	.6	1.1	1.0	38.7	.2
22	2.0	TR	3.4	.6		.2	.6	.2	TR	5.4	.2
23				TR				.8	2.1	10.0	3.2
24		TR	TR						.2	TR	
25					TR	.6	1.8		3.1	1.2	3.0
26						1.0	3.5	11.8	.6	TR	9.2
27	.4	TR	1.0	1.6	2.7	12.2	23.0	6.1	15.3	1.0	1.4
28	TR	.8	2.0	1.2	3.3	12.4	4.6	TR	TR	1.4	8.6
29	TR		.8	.2	12.3	28.6	20.4	9.2	2.0	TR	.8
30	.4	.2	2.2		1.8	.4	10.1	10.2	3.2	10.4	14.8

- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimetres) of precipitation.
- A. stands for Airport.

TABLE II(a) SOUTHERN B.C. INTERIOR

Quality Controlled, 24-Hour Rainfall Amounts, in millimeters, from the Principal Synoptic Observation Stations for the period from May 15, 1990, until May 31, 1990.

May 1990	Penticton Airport	Kelowna Airport	Kamloops Airport	Salmon Arm Airport	Cranbrook Airport	Castlegar Airport	Revelstoke Airport	Blue River Airport
15	TR	TR			1.4	.2	TR	TR
16	.4	TR	.2		.6	2.8		2.4
17	.2	2.0	1.6	.6	.8	1.8	TR	4.8
18	3.8	3.0	1.6	1.2	19.1	3.4	.2	2.6
19		5.0	2.0	TR		1.5	.2	1.4
20	4.4	4.4	2.2	5.0	2.4	4.4	4.8	2.2
21		.2		.2	TR	.4	2.6	1.4
22	16.6	14.0	3.8	14.4	.4	12.0	10.0	9.8
23	9.6	5.8	6.6	2.6	11.2	8.5	1.6	.5
24	12.4	10.0	8.5	10.2	17.4	11.3	2.8	11.8
25	1.6	6.4	7.8	7.4	17.7	6.6	20.6	6.8
26	.2	TR	TR		3.2		1.2	.2
27	.4	TR	.3			2.0		
28	7.4	6.4	5.6	4.4	3.9	9.6	TR	1.0
29	6.0	12.8	8.2	10.6	4.9	30.4	11.4	11.2
30	.4	1.2			4.6	5.4	1.2	2.5
31	12.0	3.2	.3	3.6	11.2	17.0		.2

- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimetres) of precipitation.

TABLE II(b) SOUTHERN B.C. INTERIOR

Quality Controlled, 24-Hour Rainfall Amounts, in millimeters, from the Principal Synoptic Observation Stations for the period from June 1, 1990, until June 30, 1990.

June 1990	Penticton Airport	Kelowna Airport	Kamloops Airport	Salmon Arm Airport	Cranbrook Airport	Castlegar Airport	Revelstoke Airport	Blue River Airport
01	14.8	10.8	.6	8.8	22.1	2.9	.8	4.8
02	.4	1.4	TR		6.6	TR	5.8	1.8
03	14.2	20.7	2.8	21.8	2.6	19.7	4.8	4.8
04	1.4	12.0	1.6	1.2	4.3	3.2	17.2	6.3
05							.2	.4
06	1.2	5.0	1.6	2.6		14.4		1.2
07	1.8	5.0		1.6	4.2	TR	20.0	2.2
08	.2	.2	TR	7.0	.2	.8	.6	2.2
09	3.8	4.1	5.9	5.0		13.2		3.8
10	30.0	29.8	4.6	25.8	5.8	18.7	18.8	24.0
11	TR	TR	12.1	12.8		.8	20.8	12.4
12	5.2	1.6	9.4	12.8	.6	1.1	4.4	2.6
13	2.2	TR	TR		.7	.6	TR	
14								TR
15	TR	TR						1.6
16	TR	5.6	8.2	3.4	1.4	3.0	3.0	4.4
17			TR	TR				5.2
18		1.1	2.0	8.2	1.0		1.0	.2
19		TR	7.2	9.0	TR	TR	10.8	3.4
20	TR	TR	TR	1.0	1.0		1.6	
21								
22	TR	TR			TR	2.8		.8
23	2.8	2.6			2.8	TR	TR	3.8
24	3.4	TR			1.2	TR	TR	6.2
25								
26	TR	TR			1.0	TR	1.0	2.6
27	TR	TR		1.4			1.2	1.0
28	.4	2.6	TR		5.2	1.2	.3	9.2
29			1.2	TR		3.0		2.4
30	6.0	TR			1.8		.6	1.6

- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimetres) of precipitation.

TABLE III(a) CENTRAL AND NORTHERN B.C. INTERIOR

Quality Controlled, 24-Hour Rainfall Amounts, in millimeters, from the Principal Synoptic Observation Stations for the period from May 15, 1990, until May 31, 1990.

May 1990	Williams Lake Airport	Prince-George Airport	Smithers Airport	Germansen Landing	Mackenzie Airport	Chetwynd Airport	Fort St. John Airport	Dawson Creek Airport	Fort Nelson Airport	Dease Lake
15			TR	TR		.8	1.4		TR	TR
16	4.6	1.0	TR	3.4	TR	.4	TR	.4	.2	TR
17	.2	.4		1.2	TR	TR		.6	.2	.6
18	TR	TR		.2	1.2	1.2	.4	4.6	TR	TR
19	.3	2.4				1.0	3.4	.2	TR	1.0
20	3.0	1.2	TR	4.0						
21	1.2	2.0	7.8	1.0	.3		TR	3.2		
22	2.4	7.6	1.0	2.2	1.0		TR		TR	
23	.6	1.6			1.1				.4	7.4
24	5.8	TR			.6	2.4		6.2		
25	4.0	3.6	TR	8.9	5.2	18.6	30.0	13.4	.8	
26	2.2	5.1	7.8	1.1	2.4	5.4	1.4		4.2	.4
27		TR	5.8						TR	
28	.6	.8	8.4	13.2	1.6	.2				.2
29	5.2	7.2	1.7	16.8	22.2			1.4		8.0
30	1.4	12.8		27.0	24.8	12.6	6.4	12.2	17.2	14.4
31	2.8	3.4	1.6	21.4	5.8	1.0	6.4	.8	20.0	9.8

- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimetres) of precipitation.

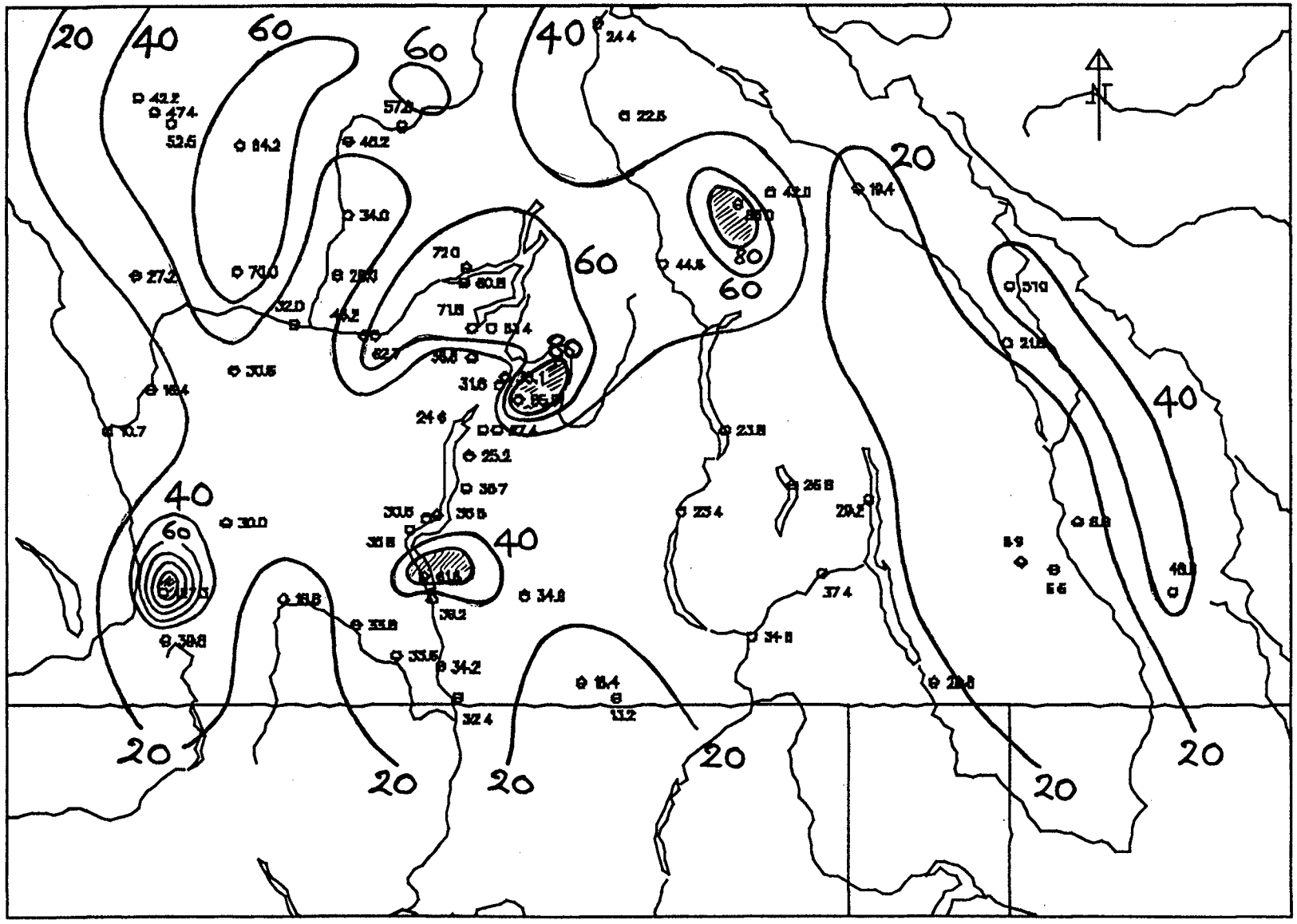
TABLE III(b) CENTRAL AND NORTHERN B.C. INTERIOR

Quality Controlled, 24-Hour Rainfall Amounts, in millimeters, from the Principal Synoptic Observation Stations for the period from June 1, 1990, until June 30, 1990.

June 1990	Williams Lake A.	Prince-George A.	Smithers A.	Germansen Landing	Mackenzie A.	Chetwynd A.	Fort St. John A.	Dawson Creek A.	Fort Nelson A.	Dease Lake
01		.4	TR	1.8	1.0	TR	2.0	.5	15.9	2.4
02		.8	4.4	1.2	.4		.2	.6		
03	5.2	14.0	26.6	17.6	20.0	23.4		6.2		.2
04	1.8	TR		7.2	7.4	3.2	.2	.8		
05	.9					3.0	TR	1.4	.8	TR
06	1.6						1.2		8.0	
07	5.0				TR				6.6	
08	TR	2.0	TR		.4			.8	.6	
09	.6	5.0								
10	8.7	11.2	2.2	14.9	6.2	20.6	5.6	18.7		
11	12.0	26.5	4.6	5.7	4.4	22.4	38.0	75.2		1.8
12	9.2	7.5	.4		TR	7.2	28.4	11.8		.4
13	TR								1.4	
14										.8
15	TR		.8		TR				.2	.2
16									TR	
17	TR	TR								
18	TR									TR
19	4.0	2.6	2.0							.2
20	TR	.6	.5							1.2
21				1.0	TR					4.8
22		1.4	TR	1.7	4.0	3.2	2.8	1.2	3.8	5.1
23		.2	.2	TR					2.7	4.4
24		.4								.8
25	TR	2.0	.4	6.5	4.2	1.2		.8	1.4	TR
26	1.6	8.0	6.3	5.1	2.6	.6	7.8	5.2	1.5	TR
27	.8		1.8				TR		13.0	1.8
28	1.2	1.6	9.3	1.0	.8			.5	TR	TR
29	.8	TR	1.0	3.4	3.4	8.4	TR	.4	1.8	1.0
30	1.4	15.2	14.5	12.6	2.8	8.2	14.5	23.2	15.8	6.4

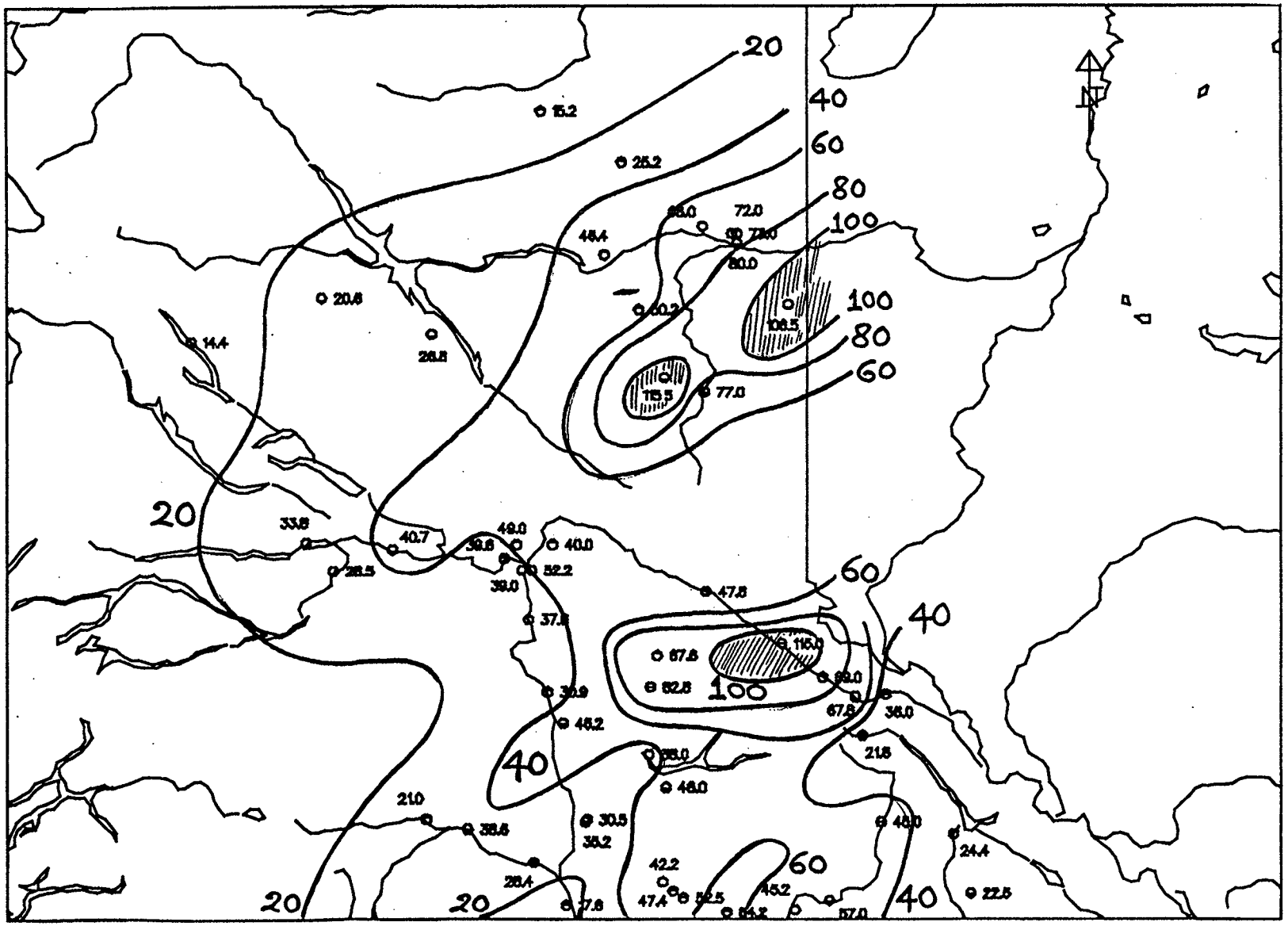
- Shaded areas highlight precipitation amounts of 5 millimetres or greater.
- TR denotes a trace amount (less than 0.2 millimeters) of precipitation.
- A. stands for Airport.

Figure 1. Storm rainfall distribution for Southern British Columbia for the period June 8th, 1990 to June 12th, 1990. The total rainfall contours, at 20 millimetre intervals, are based upon recorded rainfall amounts from the Principal Synoptic Observing and selected Climate Stations (see Table IV). The complex topography and the variable nature of the precipitation limit the accuracy of the contours between the respective observing sites.



This Page Intentionally Left Blank

Figure 2. Storm rainfall distribution for Central British Columbia for the period June 8th, 1990 to June 12th, 1990. The total rainfall contours, at 20 millimetre intervals, are based upon recorded rainfall amounts from the Principal Synoptic Observing and selected Climate Stations (see Table IV). The complex topography and the variable nature of the precipitation limit the accuracy of the contours between the respective observing sites.



This Page Intentionally Left Blank

TABLE IV

Quality Controlled, Daily Rainfall Amounts, in millimetres, from the Principal Synoptic and Selected Climate Stations for the Period from June 8, 1990 until June 13, 1990.

STATION	June 08 Fri.	June 09 Sat.	June 10 Sun.	June 11 Mon.	June 12 Tue.	June 13 Wed.	Total Rain June 8 to 12	Return Period, years, consecutive largest two day rainfall (number years used for analysis)
Alexis Creek	4.0	8.6	17.0	2.0	7.0		38.6	
Armstrong	7.0	3.6	9.6	6.8	4.6		31.6	
Armstrong North	C	C	20.9	6.6	10.6	2.2	38.1	
Baldonnel			23.4	43.8	5.8		73.0	6.6 yrs (57)
Barkerville	23.6	5.6	7.4	39.0	7.2		82.8	1.9 yrs (96)
Barriere	TR	21.4	8.2	.8	3.6		34.0	
Beaverdell North	1.2	7.0	15.6	7.5	3.6		34.9	
Blackwater Creek			18.2	4.4			22.6	
Blue River Airport	2.2	3.8	24.0	12.4	2.6		45.0	1.1 yrs (51)
Bowron Lake	10.2	2.6	20.4	32.6	1.8		67.6	
Bridge Lake 2	.6	10.2	22.0	21.8	9.6		64.2	
Brookmere	1.1	22.3	TR	2.1	4.5	TR	30.0	
Bullmoose			40.5	59.0	16.0		115.5	31.7 yrs (5)
Cache Creek 16 Mile		12.6	7.6		7.0	1.0	27.2	
Cariboo Lodge		2.9	6.3	10.8	.6		20.6	
Castlegar Airport	.8	13.2	18.7	.8	1.1	.6	34.6	
Celista	5.0	10.8	20.4	29.4	6.4		72.0	
Charlie Lake			26.0	38.0	4.0		68.0	
Chetwynd Airport			20.6	22.4	7.2		50.2	1.5 yrs (7)
Clearwater Axel Creek	.6	9.8	9.5	20.1	5.2		45.2	
Cranbrook Airport	.2		5.8		.6	.7	6.6	
Creston	1.2	15.2	2.8	1.4	.2	TR	20.8	1.0 yrs (72)
Dawson Creek Airport	.8		18.7	75.2	11.8		106.5	

Denison Plant Site		.6	45.0	38.0	15.0		98.6	
Dome Creek	2.0	3.4	24.0	18.4	5.0		52.8	
Dunster	TR	.6	25.6	40.4	2.4		69.0	8.1 yrs (14)
Fauquier	1.6	4.4	9.8	4.0	3.6	1.0	23.4	1.0 yrs (62)
Fernie			5.8	39.8	3.0	2.2	48.6	1.2 yrs (65)
Fort Fraser 13S	1.0		13.7	9.7	4.1		28.5	
Fort St John Airport			5.6	38.0	28.4		72.0	7.8 yrs (42)
Fraser Lake North	.5		16.7	15.4	1.2		33.8	
Gang Ranch		6.2	5.0	1.4	5.0		17.6	
Germanson Landing			14.9	5.7			20.6	1.2 yrs (30)
Glacier NP MT FI		1.0	27.0	53.0	4.0		85.0	2.2 yrs (20)
Glacier NP Rogers Pass		2.0	8.5	30.7	.8	TR	42.0	
Golden		1.6	5.6	11.6	.6	TR	19.4	
Goldstream River	2.2	1.7	8.2	9.9	.5		22.5	
Grand Forks	1.6	6.2	2.0	1.8	1.6	TR	13.2	1.0 yrs (44)
Greenwood	1.4	7.4	6.4	1.4	1.8		18.4	
Hedley	.6	6.6	10.8	4.4	11.4	TR	33.8	1.1 yrs (75)
Heffley Creek	.4	11.8	8.0	4.6	3.2		28.0	1.3 yrs (31)
Hixon	4.0	3.2	11.2	15.2	4.0		37.6	
Hope Slide	1.2	13.0	10.6	5.2	9.8	2.0	39.8	
Horse Lake		8.0	20.5	12.5	11.5	TR	52.5	
Horsefly Lk Gruhs Lk	1.8	8.8	24.8	12.0	.6		48.0	1.1 yrs (10)
Hudson Hope Brenot			21.4	19.8	5.2		46.4	
Joe Rich Creek	1.7	4.4	24.0	21.8	10.8	.4	62.7	
Kamloops Airport	TR	5.9	4.6	12.1	9.4	TR	32.0	1.9 yrs (34)
Kaslo	.4	14.2	7.2	6.2	1.2	TR	29.2	1.0 yrs (72)
Kelowna Lakeview	8.8	14.2	13.0	.6	TR		36.6	
Kelowna Airport	.2	4.1	29.8	TR	1.6	TR	35.7	9.0 yrs (21)
Keremeos 2	.6	18.8	11.4	.2	2.6	1.0	33.6	
Kersley	8.6	4.8	8.4	17.8	6.6		46.2	

Kimberley PCC		6.4	2.5				8.9	
Kootenay NP West Gt		5.8	7.6	3.0	5.2		21.6	
Kootenay NP Ktny		4.8	9.2	32.0E	4.8	.8	50.8	5.8 yrs (18)
Ladner Creek		21.6	38.0	34.4	33.3		127.3	1.0 yrs (5)
Likely	3.2	6.8	13.0	14.6	.4		38.0	
Logan Lake		17.0	8.0	.6	5.0		30.6	
Lytton	.2	9.8	TR		.7	.2	10.7	
McBride North		1.0	33.0	74.0	7.0		115.0	585 yrs (15) ?
McCulloch	2.0	11.1	12.0	23.0	19.4	.5	67.5	
Mica Dam	C	C	15.0	8.4	1.0	1.0	24.4	
Monte Creek	1.1	11.4	8.0	31.0	11.2	TR	62.7	
Monte Creek West	.8	9.4	7.4	16.6	12.0	TR	46.2	
Mount Robson Ranch		.8	24.0	6.8	4.4		36.0	
Nakusp	TR	6.6	8.0	6.0	3.2		23.8	
Nelson NE	1.4	9.4	16.0	8.0	2.6	TR	37.4	
New Denver	.2	10.2	6.2	5.8	4.4		26.8	1.0 yrs (58)
Oliver	4.2	8.8	20.0	TR	1.0		34.0	
100 Mile House		9.8	15.0	14.4	8.2	1.0	47.4	
108 Mile House Abel	TR	6.6	15.6	20.0	5.8		48.0	
Osoyoos	1.1	6.5	22.0	2.1	.6		32.3	
Oyama	7.8	7.2	7.6	.2	2.4	TR	25.2	
Peachland	3.2	21.6	10.2	C	.8	TR	35.8	
Penticton Airport	.2	3.8	30.0	TR	5.2	2.2	39.2	6.7 yrs (43)
Pink Mountain 2		8.0	5.0	1.2	1.0	TR	15.2	
Prince George Airport	2.0	5.0	11.2	26.5	7.5		52.2	2.8 yrs (42)
Prince George STP	4.2	2.2	9.4	19.4	3.8		39.0	
Prince George 15 NW	1.0	3.4	24.4	16.6	3.6	TR	49.0	
Prince George MI	1.0	2.2	15.0	14.6	6.8		39.6	
Princeton Airport	.6	11.2	.6	TR	6.4	1.8	18.8	1.0 yrs (43)

Quesnel Airport	9.8	3.7	10.6	2.6	4.2		30.9	1.0 yrs (38)
Red Lake	.2	13.0	28.2E	17.0	11.6		70.0	17.2 yrs (5)
Redstone Stuart Ranch		10.0	3.4	.8	6.8		21.0	
Revelstoke Airport	.6		18.8	20.8	4.4	TR	44.6	1.3 yrs (20)
Salmon Arm 3	5.6	9.4	13.4	33.8	9.6		71.8	14.7 yrs (34)
Salmon Arm Airport	7.0	5.0	25.8	12.8	12.8		63.4	
Silver Creek	7.6	11.2	6.2	12.0	1.8		38.8	
Sorrento East	4.6	7.8	22.8	21.8	3.8		60.8	
Spences Bridge Nicola		12.2	1.2		3.0		16.4	
Summerland CDA	6.0	24.6	28.6	.4	2.0	.8	61.6	69.6 yrs (69)
Takla Landing			6.4	7.8	.2	2.2	14.4	
Taylor Flats			22.0	49.0	9.0		80.0	13.1 yrs (29)
Tete Jaune		1.2	31.4	33.4	1.8		67.8	
Tumbler Ridge		.8	25.3	34.2	16.7		77.0	
Vanderhoof	TR		17.4	18.0	5.3		40.7	
Vavenby	1.2	4.6	17.4	33.2	.6		57.0	31.8 yrs (71)
Vernon Coldstream R.	3.8	4.4	5.6	3.4	10.2		27.4	1.0 yrs (82)
Vernon	4.8	6.4	8.2	1.0	4.2		24.6	
Vernon Silver Star L.	10.0E	C	29.0E	21.0	25.0E		85.0	
Wasa	2.0		5.4		1.2	.6	8.6	1.0 yrs (57)
Westbank	5.2	22.0	2.6	.2	.6		30.6	
Williams Lake River	.4	6.8	12.6	8.6	6.8		35.2	
Williams Lake Airport	TR	.6	8.7	12.0	9.2	TR	30.5	
Willow River	2.4	1.8	20.8	14.0	1.0	.2	40.0	
Wineglass Ranch	.8	6.2	13.4	TR	8.0		28.4	
Wonowon		1.8	14.4	9.0			25.2	

Note: TR - denotes a trace amount (less than 0.2 millimetres) of precipitation.
E - denotes an estimated precipitation amount.
C - Cumulative, i.e. precipitation likely occurred and the amount has been included in the next day's total.
Shaded Areas - highlight rainfall of 20 millimetres or more.

TABLE V

Significant weather related reports pertaining to the heavy rainfalls during May and June 1990 across the Northern and Southern B.C. Interior

DATE	LOCATION/ SOURCE	REPORT/OBSERVATION
MAY 1990		
21	Terrace Weather Office	A total of 23.6 mm of rain fell in one precipitation event at the airport. The rivers in the region are in their peak surge.
22	Prince George Weather Office	Two funnel clouds and brief heavy thundershowers were reported around Mud River, 15 miles from downtown Prince George.
25	Fort St. John Weather Office	Received heavy rain today, the daily total was 30.0 mm at the airport!
29	Castlegar Weather Office	A record amount of daily precipitation, 30.4 mm, fell today at the airport. The previous record was 23.1 mm set in 1969.
30 to June 1	Fort Nelson Weather Office Report	A disturbance moved over the area from the Peace River Region which caused very unstable conditions. The rain brought down late spring snowpacks. The rain totalled 53.1 mm from May 30rd to June 1st at the airport, also it produced a new daily rainfall record of 20.0 mm on May 31st.
31	Penticton Weather Office	All time record monthly precipitation total for May of 86.4 mm, the previous record was 86.1 mm set in August 1976. Furthermore, there was a record number of days, 19, with measureable precipitation. The previous record was for 17 days in May 1942.
JUNE 1990		
2	Prince George Weather Office Report	Fraser River Crested at Prince George today at 9.91 metres (flood stage is 9.4 metres). High water caused by a combination of heavy rainfall in April and May, and a thick winter snowpack which was at record levels in part of the upper Fraser River Drainage Basin in mid-May (snow course data).
3	Castlegar Weather Office	Record daily precipitation amount of 19.7 mm received at the airport, the previous record was 11.6 mm set in 1988.

3 to 4	Kelowna Weather Office Report	An intense upper low pressure centre gave unstable moist air over the southern interior. Severe thunderstorm activity with heavy showers during the evening of the 3rd and the next early morning. Overnight, the Kelowna Airport had 27.3 mm of rain. Okanagan Mission Tozer Road Climate Observer reported that 59.8 mm of rain fell for June 3rd. The Westbank station recorded 38.8 mm overnight and 38.2 fell at Vernon Coldstream Ranch. Rainfall was lighter to the south, Penticton had 15.6 mm and Osoyoos 11.4 mm over the two days, and Oliver received 17.3 mm for the one day alone, June 3rd.
4	Fort St. John Weather Office	Very high water levels in the Graham, Halfway river systems, possibly due to warm weather earlier in the week following by rain and snow.
10	Kelowna Weather Office	Greatest one day precipitation record of 29.8 mm at the airport, the previous record, 27.2 mm, set on June 29, 1986. Okanagan lake level kept higher than normal over the winter because of lower than normal mountain snowpack.
10 to 12	Prince George Weather Office Report	A slow moving low pressure system gave almost continuous rain for 36 hours, from 1:50 pm on the 10th to 1:30 am on the 12th at the Prince George Airport! Storm rainfall was 45.2 mm between 5:22 am on the 10th and 3:25 pm on the 12th. Storm rainfall at Hixon was 30.4 mm, 30.7 mm at Vanderhoof, and 43.2 mm at Fort St. James. Quesnel, Williams Lake and Mackenzie received considerably less than Prince George. The very heavy winter snowpack, record April rainfall, and heavy May rainfall had already saturated the ground and raised the streams and rivers.
11 to 12	Fort St. John Weather Office Report	A total of 66.4 mm of rain fell at the Airport over these two days. Dawson Creek was hit harder, over 100 mm of rain fell in the area. Even heavier amounts fell across the south Peace Region. Grande Prairie had 96.0 mm for June 10 to 12th. Beaverlodge had 150 mm at the research station with amounts up to 178 mm within a few miles of the station!
25	Kelowna Weather Office	Okanagan Lake has nearly peaked at 342.95 metres (its normal full level is 342.54 metres) and in the record flood year of 1948 the level reached 343.135 metres. As of June 30th the monthly precipitation total is 102.5 mm which now ranks as the second all time wettest for the period of record (22 years). The record is for 123.7 mm set for August 1976.
30	Penticton Weather Office	The June monthly total of 87.8 mm is the wettest month ever recorded since records began in 1941. This surpassed the previous record set last month.
30	Prince George Weather Office	Two funnel clouds reported and grape sized hail. At noon a heavy shower gave 13.4 mm of rain in 68 minutes at the Prince George Airport. Also the observer of the Spokine Lake Climate Station, 20 miles NE of Williams Lake, reported a severe hailstorm with hailstones the size of mothballs, and received 11.0 mm of rain for June 30th.

Note: The above reports were taken from the Weather Offices' Weekly Climate Messages.