



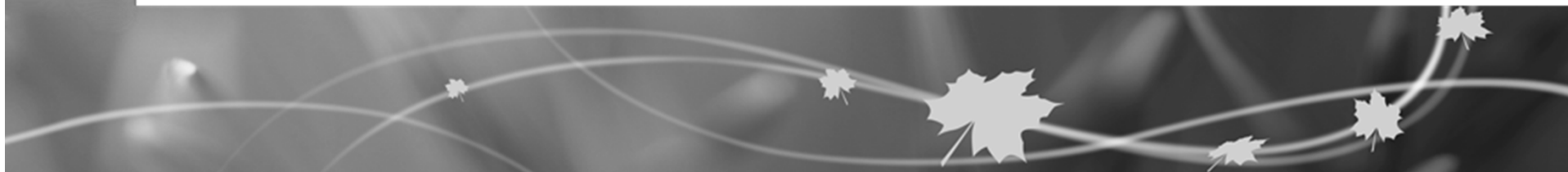
Environment
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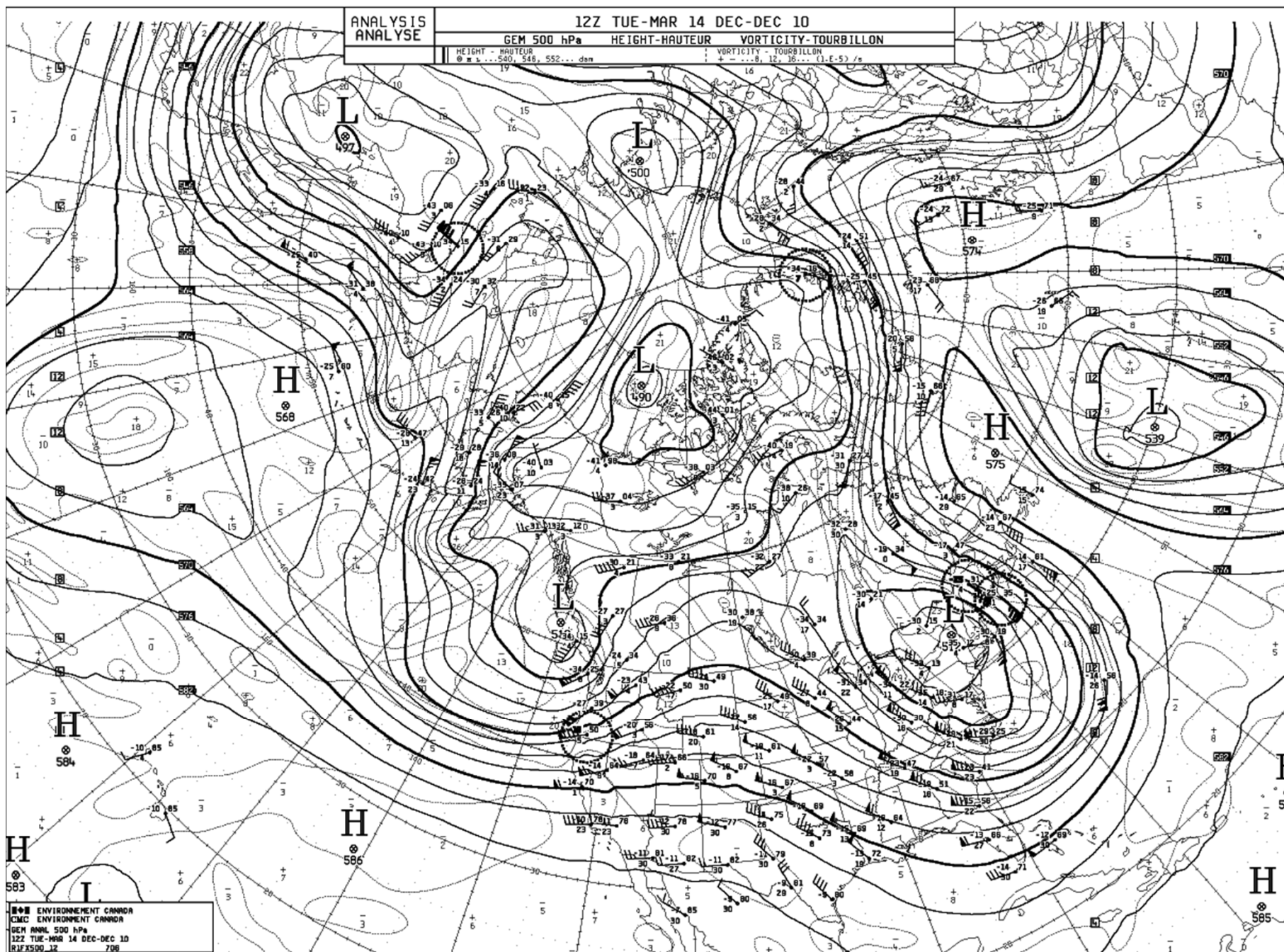
Heavy Rain and Flooding in New Brunswick Dec 12-15 2010

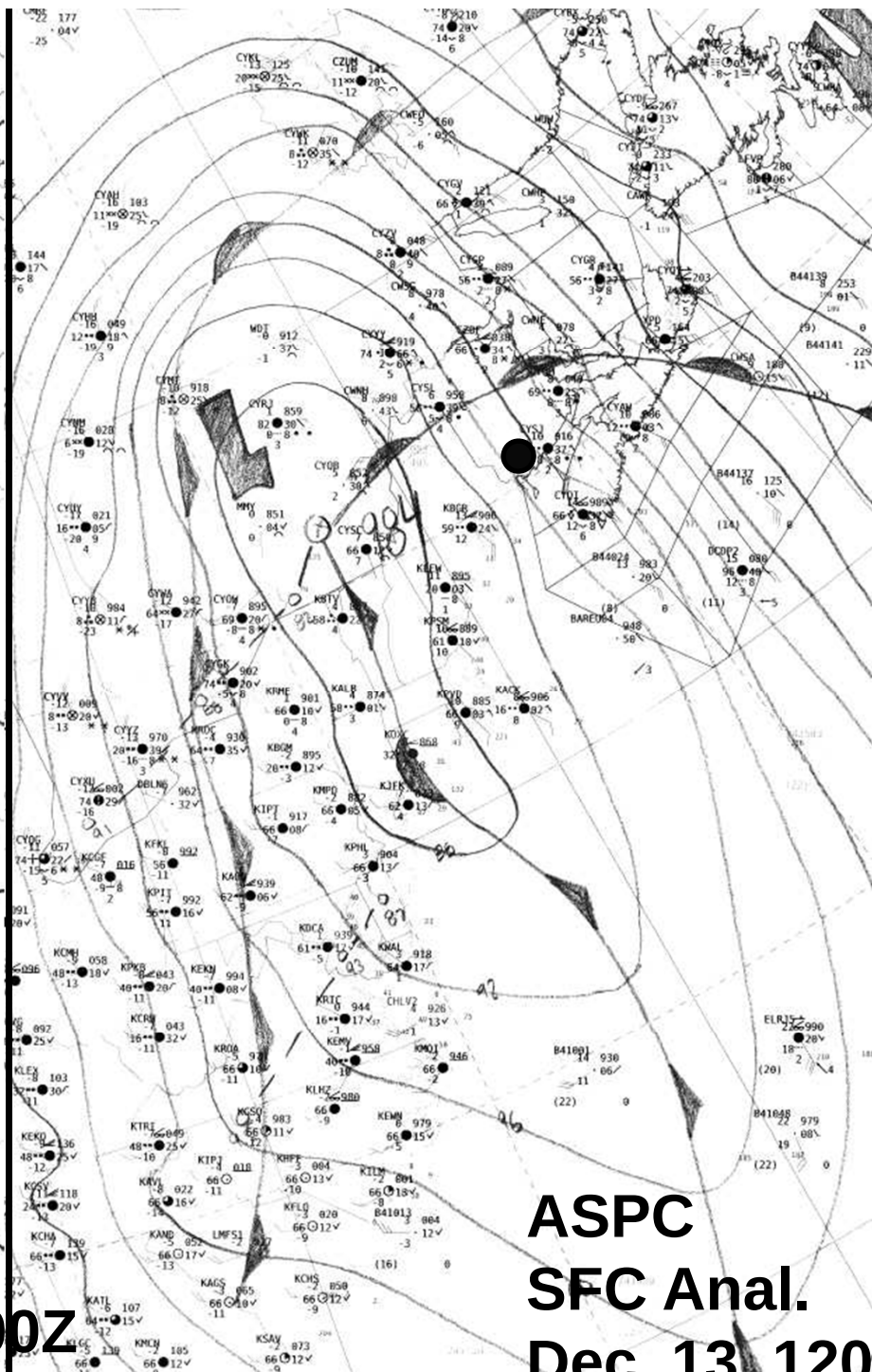
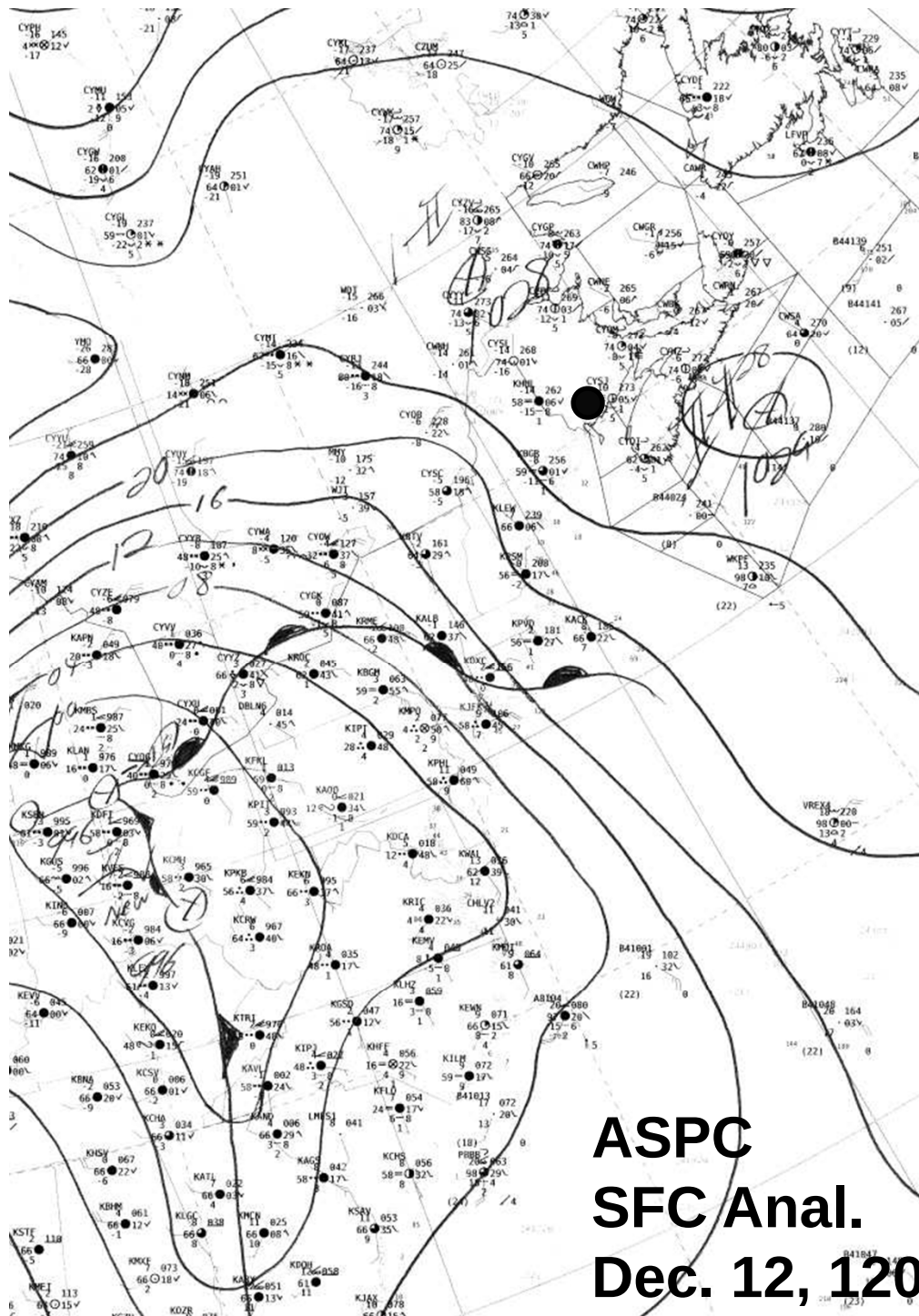
**Prepared by:
Rick Fleetwood
Sept 6, 2013**



Outline

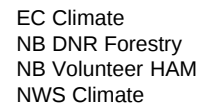
- Overview of Dec 2010 heavy rain event and impacts
- Some historical perspective of heavy precipitation events
- New EC precipitation monitoring initiative



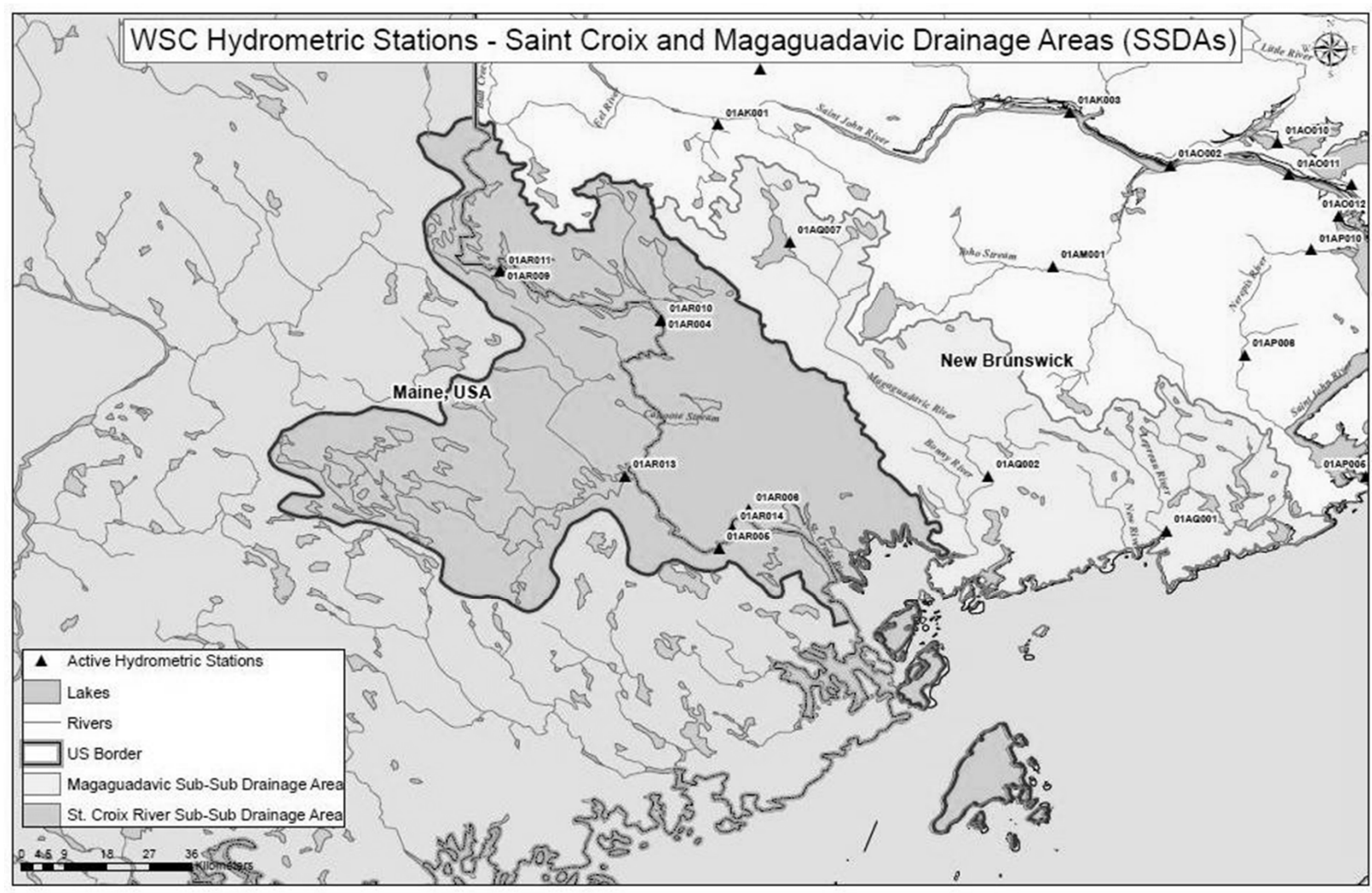


Total Precipitation December 12-15 2010
Précipitation totale 12-15 décembre 2010

Environnement Canada
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Centre Climatologique
de l'Atlantique



St. Croix & Maguagadavic Watersheds





Flood photos

A boat navigates the flood waters in southwestern New Brunswick on Wednesday, Dec. 15, 2010, where normally a road would travel. (CBC)



Flood photos

Few people in the St. George area have ever seen water rush over the local dam. (CBC)



Flood photos

Waves of water wash over the Lake Utopia dam in St. George. (CBC)





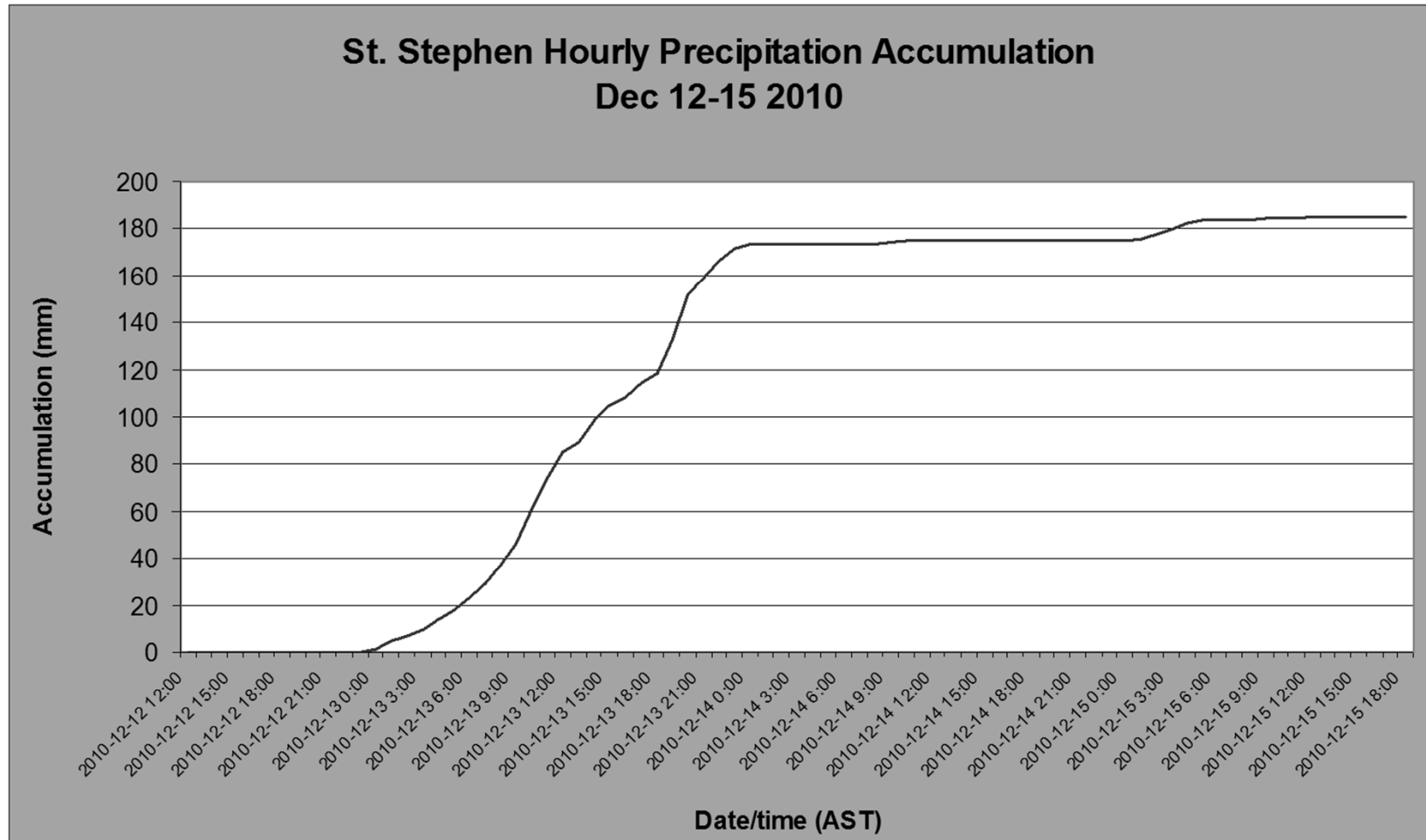


Flood photos

Only a guard rail still outlines where a road once stood in Bear Island. (CBC)



Hourly Accumulation St. Stephen



DENNIS STREAM NEAR ST. STEPHEN [NB] (01AR006)

Data Category:

Real Time



Go

Download Format:

Tab-delimited



Download

Parameter Type:

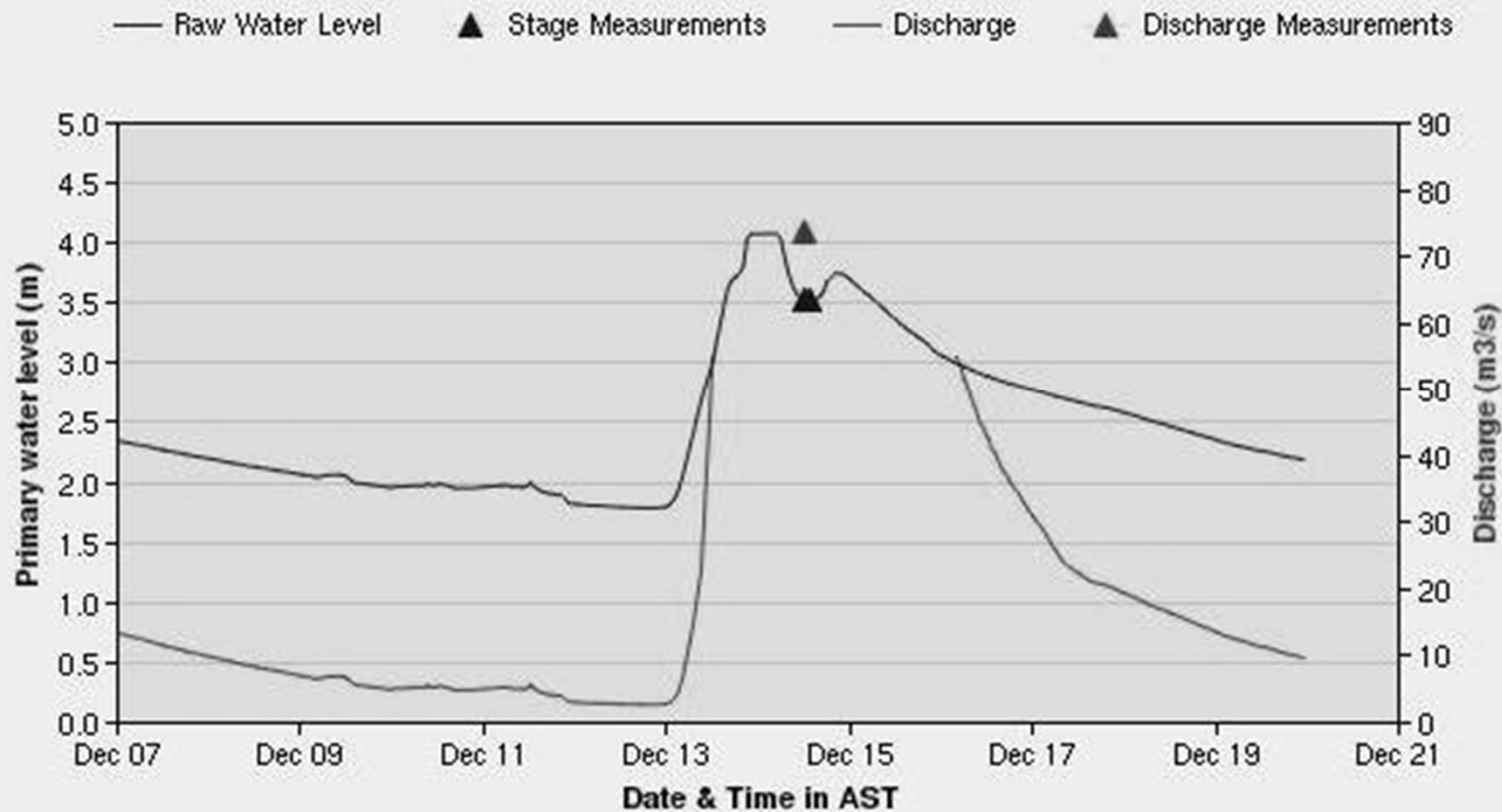
Primary water level



Discharge



Redraw



ST. STEPHEN
NEW BRUNSWICK

Latitude: 45°12'36.600"N
Climate ID: 8104935

Longitude: 67°15'10.300"W
WMO ID: 71607

Elevation: 26.10 m
TC ID: WSS

Previous Month

November 2010 Go

Next Month

Daily Data Report for November 2010

D a y	Max Temp °C ☑	Min Temp °C ☑	Mean Temp °C ☑	Heat Deg Days °C ☑	Cool Deg Days °C ☑	Total Rain mm ☑	Total Snow cm ☑	Total Precip mm ☑	Snow on Grnd cm ☑	Dir of Max Gust 10's Deg	Spd of Max Gust km/h ☑
01†	7.9	-1.4	3.3	14.7	0.0	M	M	0.0	1	33	33
02†	3.3	-4.5	-0.6	18.6	0.0	M	M	0.0	1	33	32
03†	8.1	-5.0	1.6	16.4	0.0	M	M	0.0	1		<31
04†	14.3	-5.1	4.6	13.4	0.0	M	M	21.1	1	13	32
05†	17.4	11.2	14.3	3.7	0.0	M	M	44.9		19	61
06†	11.2	4.9	8.1	9.9	0.0	M	M	0.8			<31
07†	6.0	3.5	4.8	13.2	0.0	M	M	16.8		36	44
08†	12.3	5.9	9.1	8.9	0.0	M	M	33.2	1	3	52
09†	11.0	3.8	7.4	10.6	0.0	M	M	2.3		3	52
10†	6.4	1.5	4.0	14.0	0.0	M	M	0.0		1	63
11†	9.1	-2.4	3.4	14.6	0.0	M	M	0.0		2	43
12†	16.6	-3.2	6.7	11.3	0.0	M	M	0.0			<31
13†	17.5	-2.9	7.3	10.7	0.0	M	M	0.0			<31
14†	9.3	-2.1	3.6	14.4	0.0	M	M	0.0			<31
15†	9.3	-2.2	3.6	14.4	0.0	M	M	0.0			<31
16†	9.3	6.0	7.7	10.3	0.0	M	M	6.1			<31
17†	13.3	5.6	9.5	8.5	0.0	M	M	18.9		13	50
18†	8.9	-2.9	3.0	15.0	0.0	M	M	0.0		26	56
19†	3.4	-7.6	-2.1	20.1	0.0	M	M	0.0		27	41
20†	6.1	-8.0	-1.0	19.0	0.0	M	M	0.0		29	48
21†	0.3	-9.4	-4.6	22.6	0.0	M	M	0.0		30	41
22†	5.1	-9.0	-2.0	20.0	0.0	M	M	3.8			<31
23†	7.9	2.6	5.3	12.7	0.0	M	M	4.7			<31
24†	6.4	-1.2	2.6	15.4	0.0	M	M	0.0		31	52
25†	2.6	-4.1	-0.8	18.8	0.0	M	M	0.0		31	44
26†	1.8	-4.1	-1.2	19.2	0.0	0.0	M	7.9			<31
27†	0.5	-6.8	-3.2	21.2	0.0	0.0	M	2.7	1		<31
28†	0.5	-9.5	-4.5	22.5	0.0	M	M	0.0	3		<31
29†	3.6	-10.2	-3.3	21.3	0.0	M	M	0.0	3		<31
30†	5.8	-10.3	-2.3	20.3	0.0	M	M	0.0	3		<31
Sum				455.7	0.0	0.0*	M	163.2			
Avg	7.8	-2.2	2.81				N ~126mm				
Xtrm	17.5	-10.3					(30% above)		1		63

ST. STEPHEN
NEW BRUNSWICK

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Daily Data Report for December 2010

D a y	Max Temp °C ☑	Min Temp °C ☑	Mean Temp °C ☑	Heat Deg Days °C ☑	Cool Deg Days °C ☑	Total Rain mm ☑	Total Snow cm ☑	Total Precip mm ☑	Snow on Grnd cm ☑	Dir of Max Gust 10's Deg	Spd of Max Gust km/h ☑
01†	6.7	-3.6	1.6	16.4	0.0	M	M	0.0	3	13	41
02†	9.0	2.5	5.8	12.2	0.0	M	M	15.5	1	13	46
03†	7.4	2.2	4.8	13.2	0.0	M	M	25.1	1	2	32
04†	7.8	4.3	6.1	11.9	0.0	M	M	4.6	1		<31
05†	4.3	2.1	3.2	14.8	0.0	M	M	1.8	1		<31
06†	2.7	-3.2	-0.3	18.3	0.0	0.0	M	31.3	6	26	35
07†	-0.8	-7.9	-4.4	22.4	0.0	M	M	2.1	12		<31
08†	-3.5	-11.9	-7.7	25.7	0.0	M	M	0.0	11		<31
09†	-4.8	-15.1	-10.0	28.0	0.0	M	M	0.0	11		<31
10†	-6.1	-14.1	-10.1	28.1	0.0	M	M	M	11		<31
11†	-1.1	-10.6	-5.9	23.9	0.0	0.0	M	0.6	12		<31
12†	7.2	-8.3	-0.6	18.6	0.0	M	M	7.1	12	11	44
13†	15.4	7.1	11.3	6.7	0.0	M	M	166.4		16	72
14†	9.3	-0.7	4.3	13.7	0.0	0.0	M	3.8		31	35
15†	-0.7	-7.7	-4.2	22.2	0.0	0.0	M	7.7	10	31	37
16†	-5.7	-15.5	-10.6	28.6	0.0	M	M	0.0	3		<31
17†	-2.5	-16.4	-9.5	27.5	0.0	0.0	M	1.7	2		<31
18†	-4.2	-15.1	-9.7	27.7	0.0	M	M	0.0	6		<31
19†	-1.2	-16.2	-8.7	26.7	0.0	M	M	0.0	6		<31
20†	3.0	-8.8	-2.9	20.9	0.0	M	M	0.0	5	36	43
21†	3.6	1.2	2.4	15.6	0.0	M	M	3.7		1	56
22†	1.4	0.4	0.9	17.1	0.0	0.0	M	12.8		36	35
23†	1.5	-1.6	-0.1	18.1	0.0	M	M	0.8	2	1	46
24†	-0.1	-6.8	-3.5	21.5	0.0	M	M	0.0		34	39
25†	-2.2	-9.0	-5.6	23.6	0.0	M	M	0.0	1	32	33
26†	-0.7	-8.7	-4.7	22.7	0.0	0.0	M	4.9	1	3	43
27†	1.1	-6.6	-2.8	20.8	0.0	0.0	M	14.9	7	36	59
28†	-6.0	-9.0	-7.5	25.5	0.0	M	M	0.0	12	34	59
29†	-3.4	-9.3	-6.4	24.4	0.0	M	M	3.1	11	28	33
30†	-0.1	-15.4	-7.8	25.8	0.0	M	M	0.0	9		<31
31†	5.1	-9.0	-2.0	20.0	0.0	M	M	0.0	10		<31
Sum				642.6	0.0	0.0*	M	307.9*			
Avg	1.4	-6.8	-2.71				N ~137mm				
Xtrm	15.4	-16.4					(124% above)		16		72

Precipitation Return Period Analysis

- Return period analysis based on long periods of record 69 to 139 years at several SW NB locations
- For many of the hardest hit areas this event exceeded the 1/100 year return period

Return Period Analysis

Total Precipitation December 12-15 2010
Précipitation totale 12-15 décembre 2010

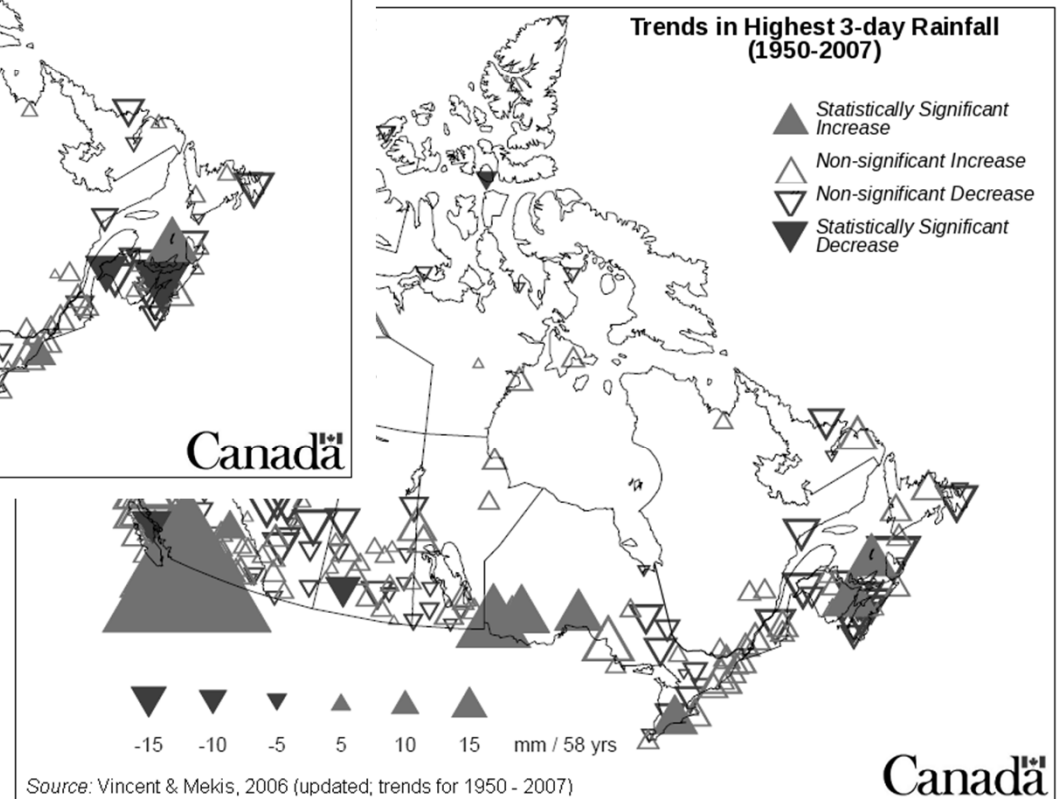
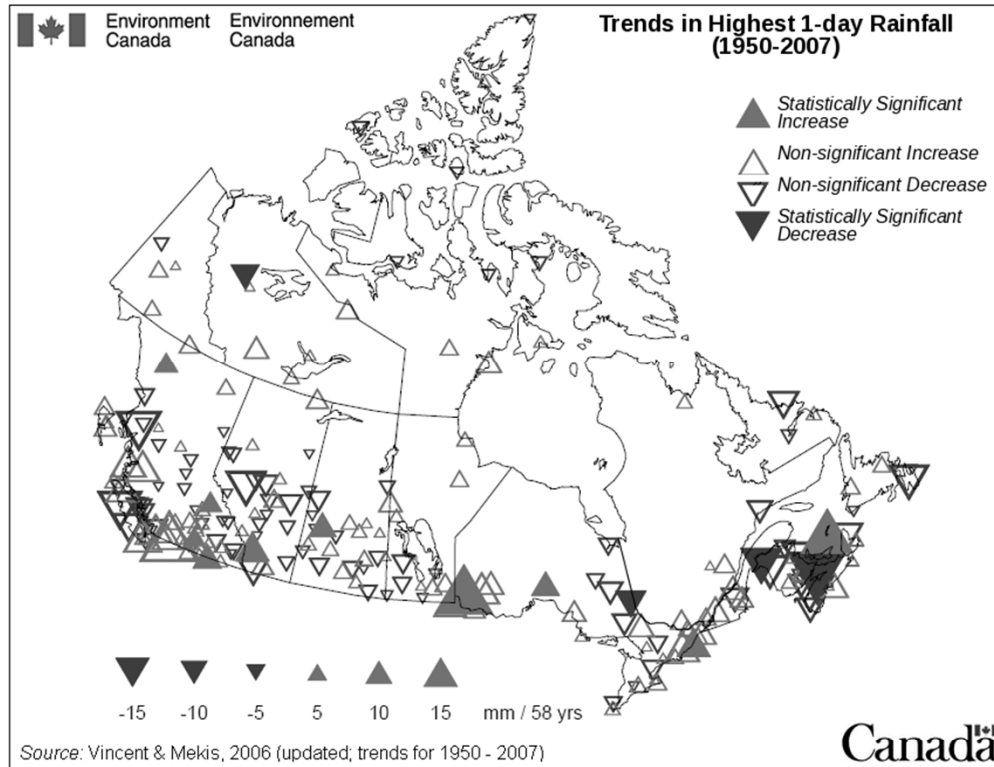


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Atlantic Climate
Centre

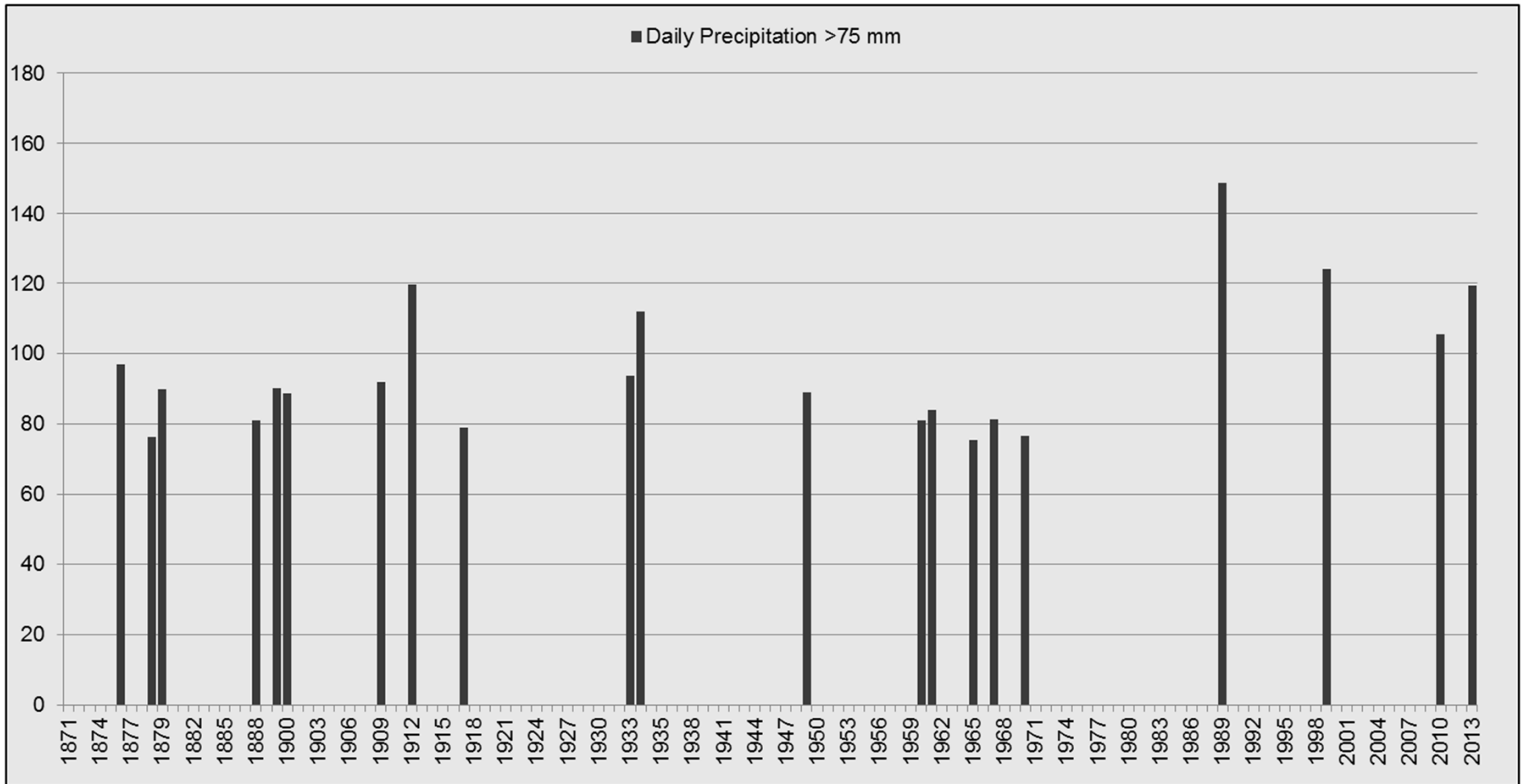
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de l'Atlantique



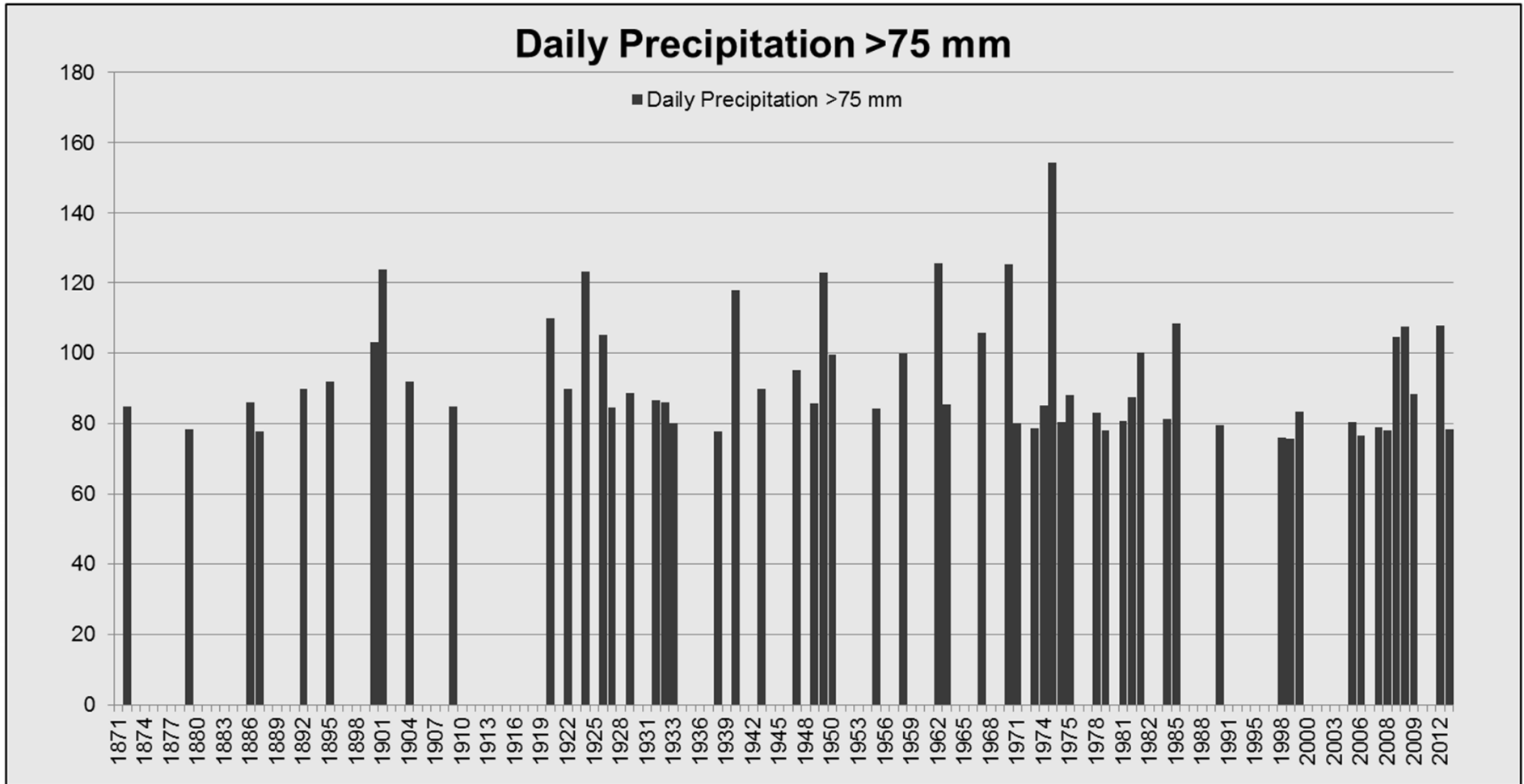
Historical Precipitation Trends



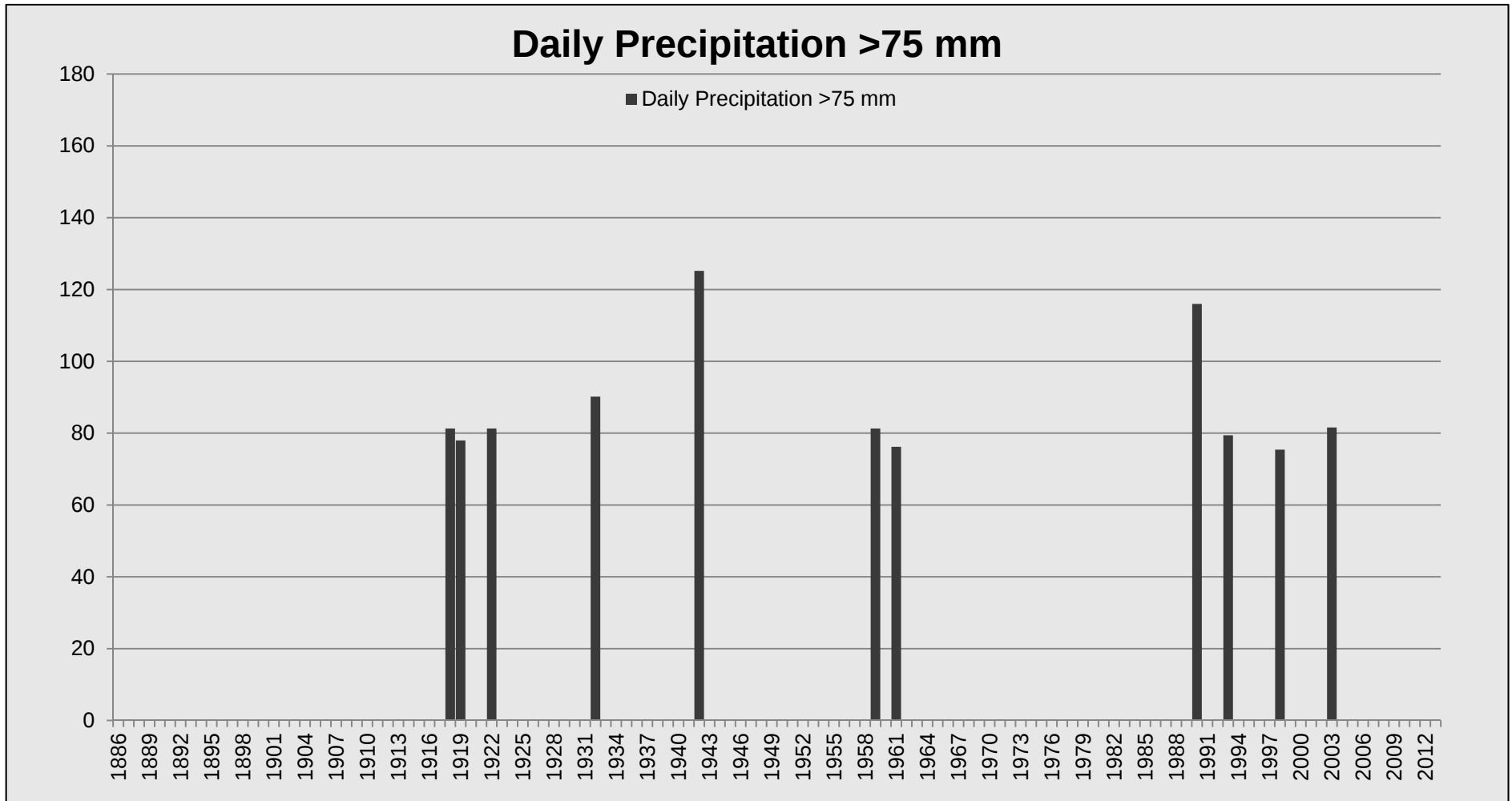
Historical 1 Day 75 mm + Precipitation Events Fredericton



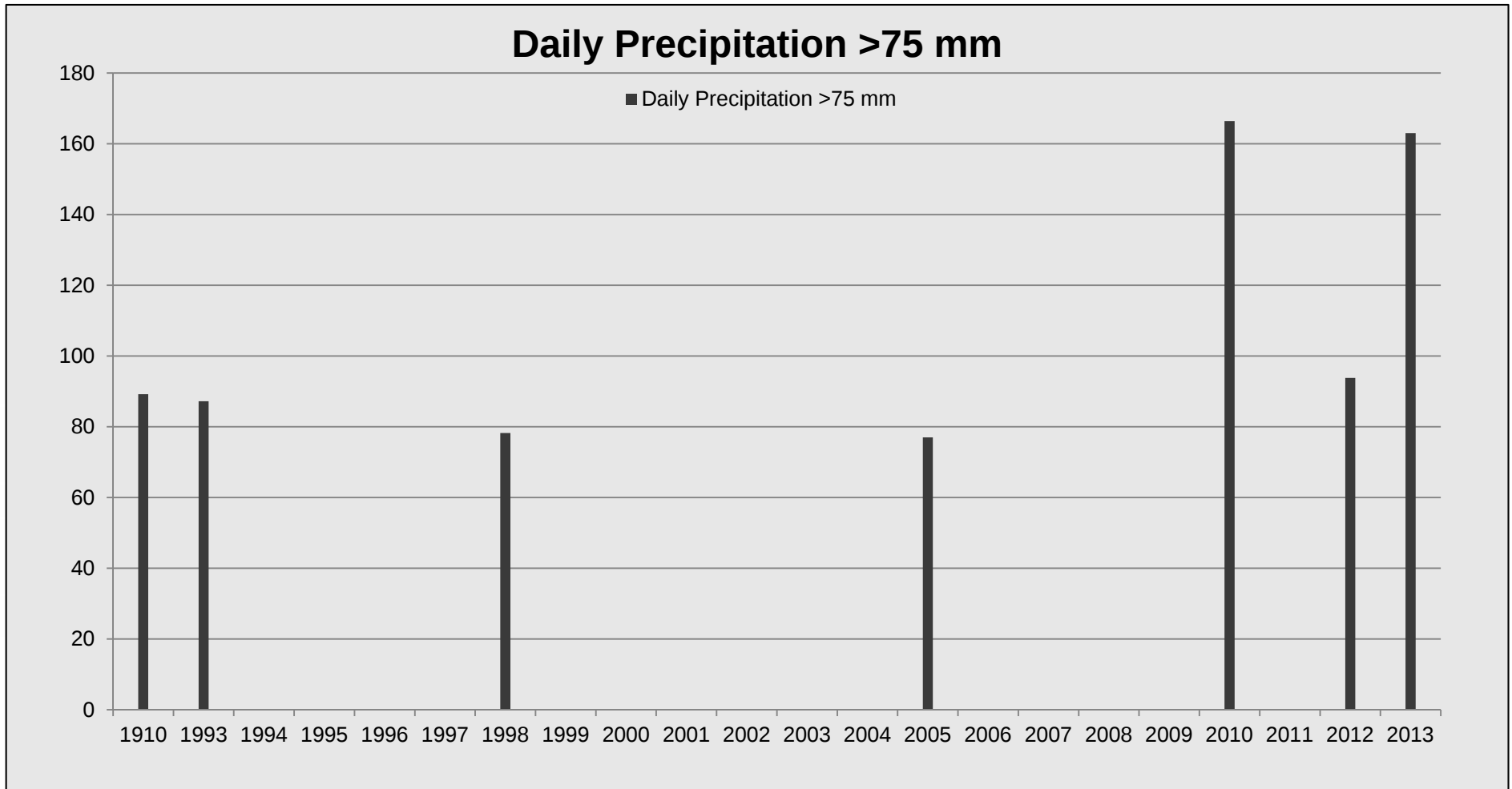
Historical 1 Day 75 mm + Precipitation Events Saint John



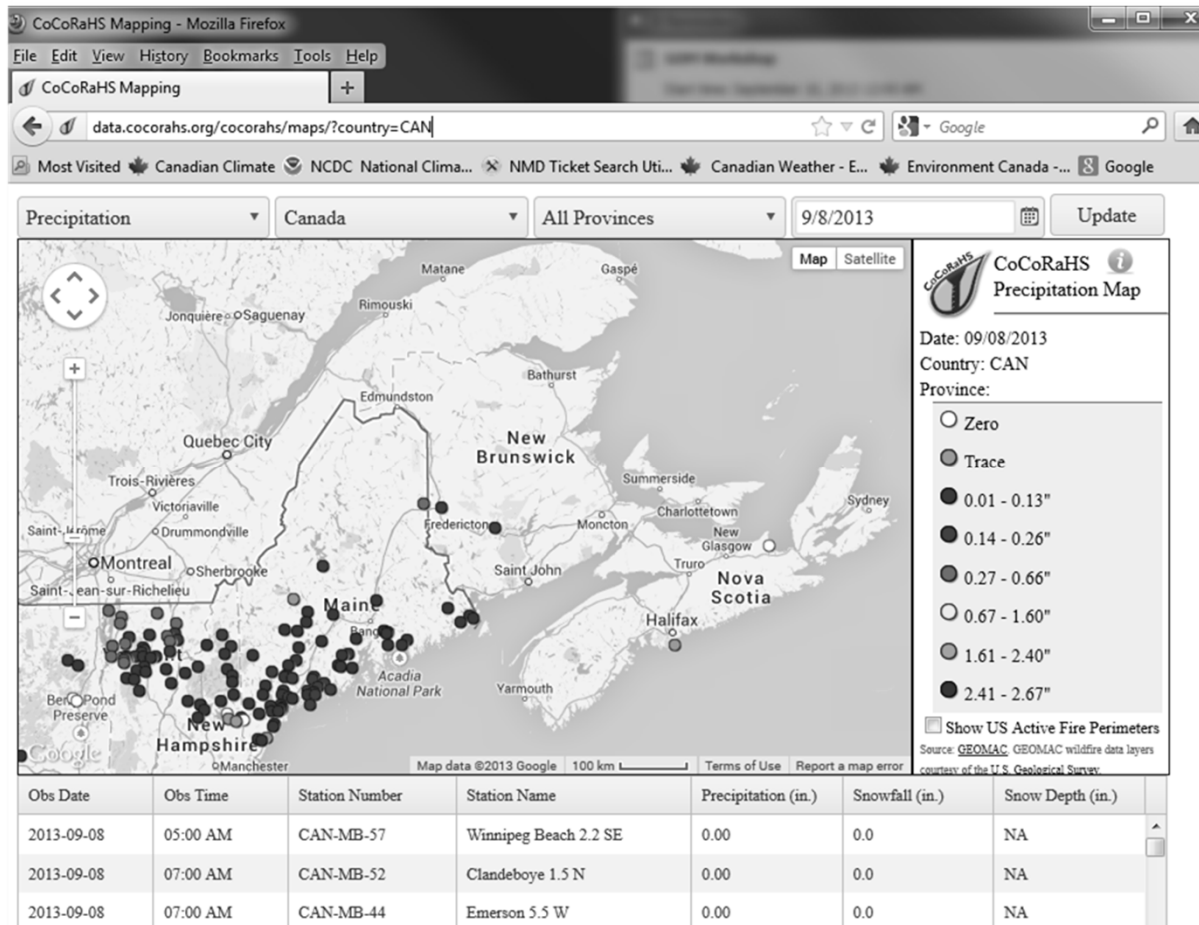
Historical 1 Day 75 mm + Precipitation Events Woodstock



Historical 1 Day 75 mm + Precipitation Events St. Stephen



CoCoRaHS Canada Precipitation Monitoring Initiative (<http://www.cocorahs.org/Canada.aspx>)



- 22 new sites established in Maritimes
- Goal is 100 across all 4 provinces in next couple of months