

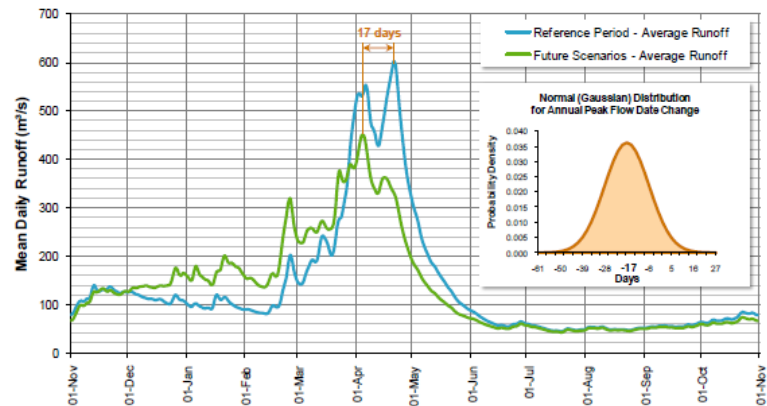
# Water Management



# Competing Interests and Climate Change

- In the event of wet conditions:
- Public Safety can be endangered with increased water levels/flows.
- Resulting high flows can disrupt navigation along the waterway.
- High flows allow fish to spawn in elevated areas prone to declines.
- Excess spill at many hydro generating stations.

Figure 4-6 - Ensemble Average Mean Daily Runoff for the Future scenarios (2041–2070) and Mean Daily Runoff for the Reference Period (1970–1999)





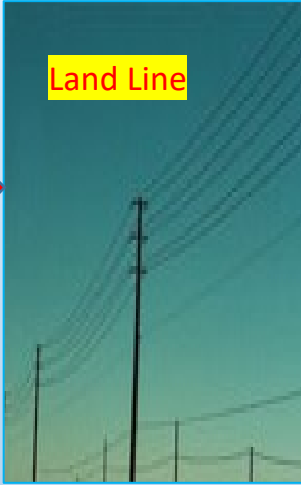
## Competing Interests

- In the event of dry conditions:
- Public Health is not initially endangered,
- Water quality can be endangered.
- Navigation can be threatened as lake levels decline
- Fish spawn in shallow areas are in danger of being left dry.
- Reservoir lake levels drop more than normal.
- Hydro generation is diminished as water flow is reduced.



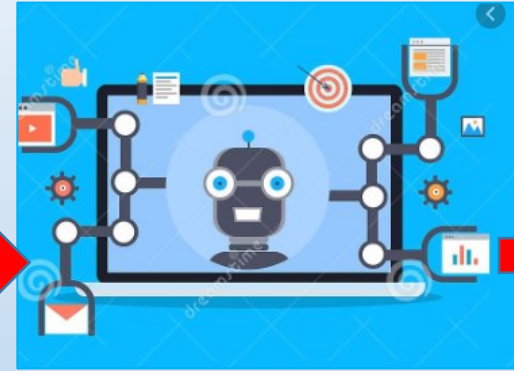


# Daily Routine



## Local Servers run Automated Scanning Script

Electronic database compiles automated and manual data for use by the Water Management Team

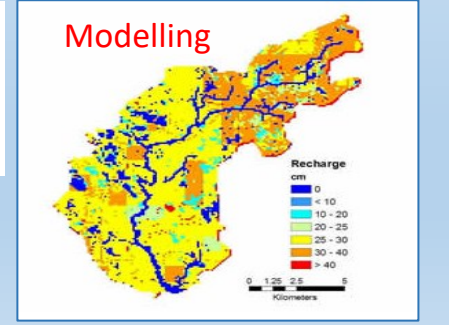
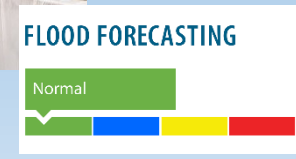
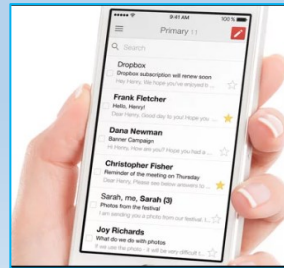


Communicate information to CA's, MNRF and EMS

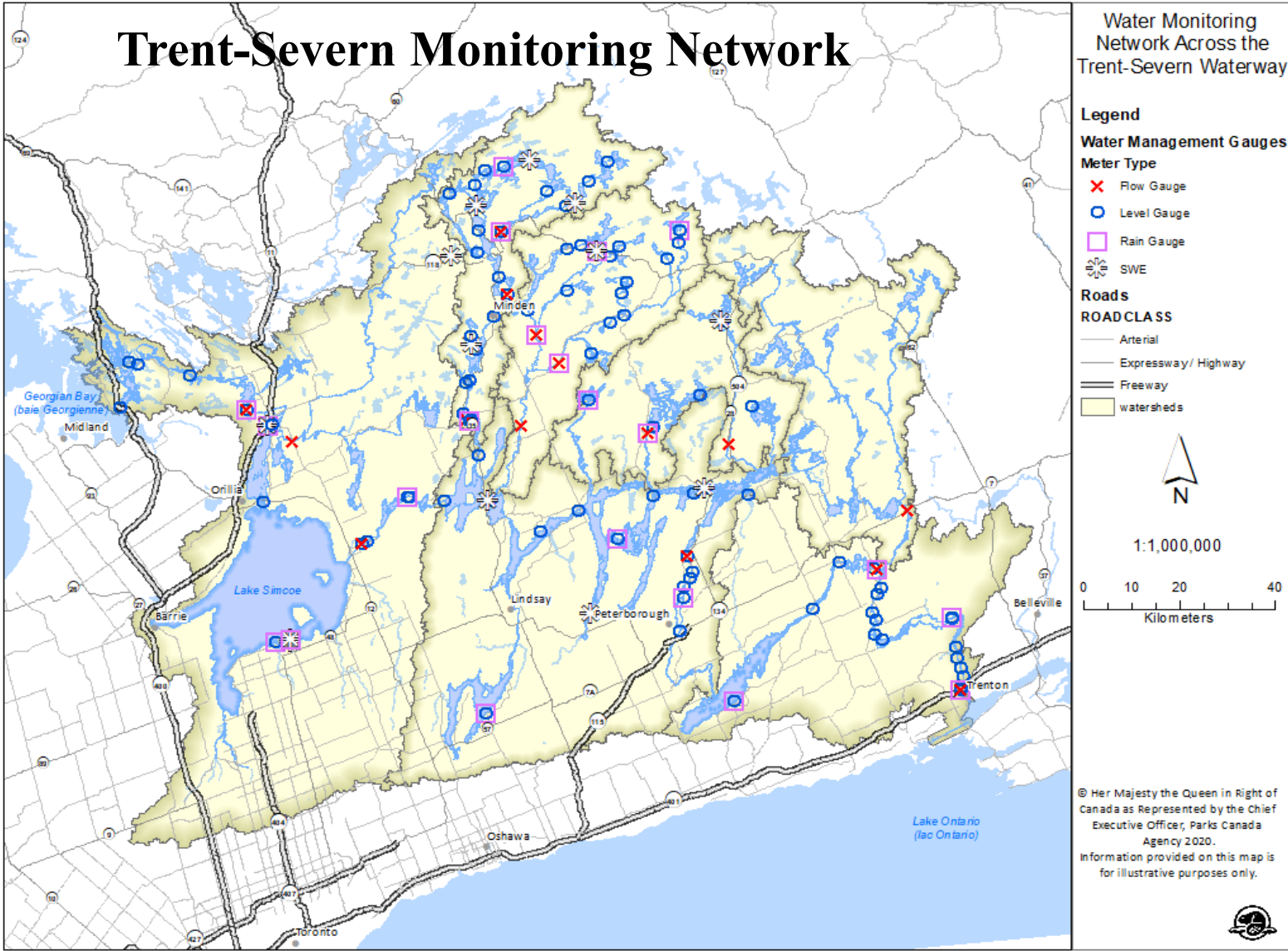
## StopLog Operations



Daily email to water managers



# Trent-Severn Monitoring Network

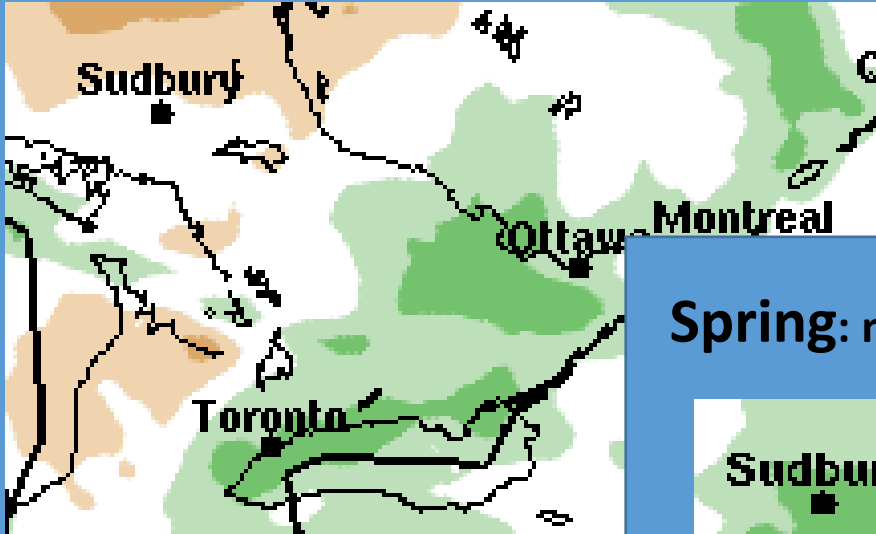


- 2021-2024 Telemetry Upgrade Project
- 3 year project transitioning landline communication to satellite/cellular across the entire system of both canals
- Currently 60-70 gauges have upgraded telemetry – cellular or satellite
- Winter-Spring 2023-24 all gauges will be transitioned

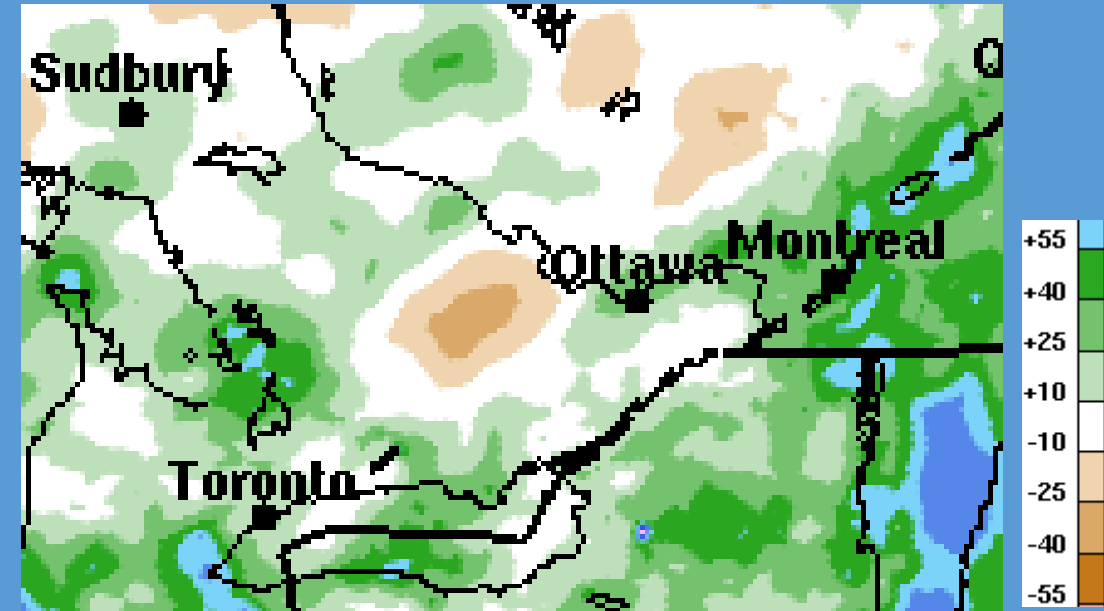


# 2023 Climatic Conditions

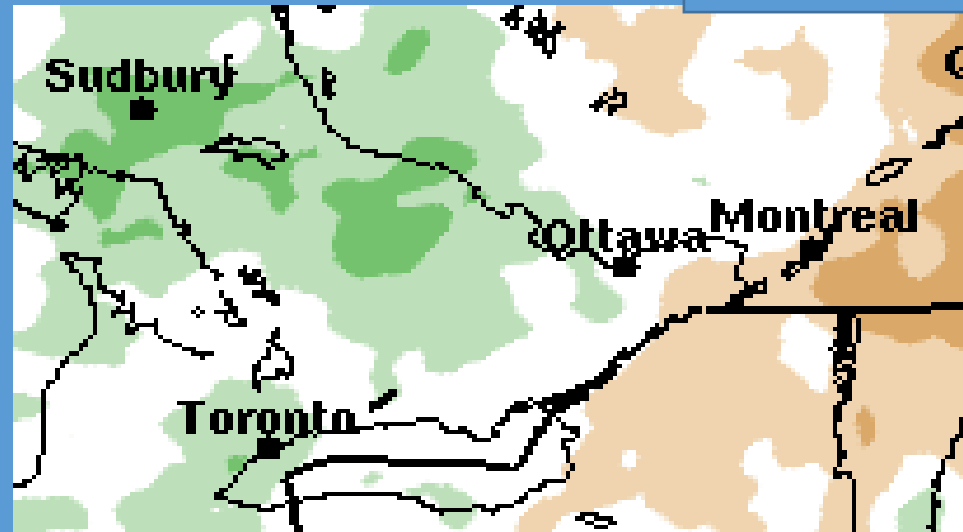
**Winter: 10-40% above 3 months normal**



**Summer: 10-40% above 3 months normal**



**Spring: normal 3 months totals**



# Winter wallop knocks out power for thousands in Peterborough County, collisions snarl highway traffic

"Only seen a couple of storms like this in the last 20 years."

By Examiner Staff-The Canadian Press

Friday, December 23, 2022 | ⌚ 12 min to read

A "weather bomb" dumped more than 30 millimetres of rain on the Peterborough area Thursday night and Friday morning before light snow, gusty winds up to 63 km/h and frigid temperatures moved in to freeze things up Friday afternoon as [a major winter storm swept across Ontario](#).

Wind gusts to 63 km/h were recorded Friday afternoon at the Peterborough Airport. By 7 p.m., the temperature had plunged to -13 C, feeling more like -23 C with the wind chill.

Hydro One crews were dealing with scattered power outages across Peterborough County, with a few in the city, after power lines were knocked out during the storm. Many won't see their power restored until Saturday.

Hydro One said roughly 70,000 customers in the province's southern and eastern regions were without power, with more than 30,000 not expected to have their power restored before 11 p.m.

The city has activated a public inquiry line at 705-876-4636 with recorded messages to provide information to people in the case of widespread power outages. The city advised Friday afternoon that Bell Canada was experiencing issues with routing of calls that could affect Bell Canada customers calling the public inquiry line.



The OPP is urging drivers to stay home during the Ontario winter storm as more than 100 vehicles have been involved in collisions along a busy stretch of Highway 401.  
Twitter / OPP West Region

# Ski hills close, Parliament Hill lightshow cancelled as heavy rain soaks Ottawa on New Year's Eve

## 7 DAY FORECAST OTTAWA



Mother Nature is raining out some New Year's Eve plans, as Ottawa and eastern Ontario wrap up the year under heavy rain and a blanket of fog.

Environment Canada had issued a rainfall warning for Ottawa and eastern Ontario on Saturday, calling for 20 to 30 mm of rain by Sunday morning. A fog advisory was also in effect for Ottawa.

A total of 28 mm of rain was reported at the Ottawa Airport on Saturday.

The rainfall record for Dec. 31 is 73.2 mm, set in 1933. The Ottawa Airport record is 14.5 mm, set in 1972, but records at the airport only date back to 1938.



"Rain continues this evening and is expected to come to an end tonight," Environment Canada said in a statement.

"Total rainfall amounts of 30 mm are possible over a few locations."

The fog is expected to dissipate Saturday night, as a low pressure system moves east of the region, Environment Canada said.

The heavy rain has forced the temporary closure of several ski hills in the region, while the National Capital Commission is asking people to avoid snowshoeing and snow biking in Gatineau Park.

Winter Lights Across Canada on Parliament Hill has been cancelled on New Year's Eve.

Conservation authorities warn water levels could rise on lakes and rivers across the region, but no "significant flooding" is expected this weekend.

The heavy rain follows 83 cm of snow blanketing Ottawa over the last two weeks, and then two days of record-breaking warm temperatures.

- [Current conditions and forecast](#)
- [Air Quality Health Index - Ottawa | Environment Canada](#)
- [Environment Canada watches and warnings](#)
- [Interactive traffic map: Plan your route](#)
- [IN PICTURES: Weather watcher drawings](#)

### RELATED STORIES

- [Second straight day of record-breaking warm temperatures in Ottawa](#)



# Aug 10 2023: Flash Flood Ottawa

The city of Ottawa is cleaning up, and drying out, after heavy rain flooded roads, parking lots, parks and properties with up to three feet of water.

Environment Canada says between 31.5 mm and 100 mm of rain was fell across the city on Thursday, with the neighbourhoods of Carleton Heights and the Riverside area seeing nearly 100 mm of rain.

A total of 77.8 mm of rain was recorded at the Central Experimental Farm on Thursday, while 38.3 mm of rain fell at the Ottawa International Airport weather station.

"What a period of rain. I think what surprised me was how quickly it came and then left," Environment Canada senior climatologist David Phillips told CTV Morning Live.

"This was huge; that's more than you get in the month of August and you had that in an hour-and-a-half."

- [Here's a look at the scenes from the flash flooding in Ottawa](#)

The storm hit Ottawa just before 11:30 a.m., with some areas seeing 50 to 70 mm of rain in 90 minutes. The Central Experimental Farm recorded a peak rainfall rate of 48.7 mm in one hour.

"This was just a hit and dump in about 90 minutes," Phillips said. "The city has never seen such an intensity of rain as in what we saw yesterday; no wonder there was this flooding and cars stranded."

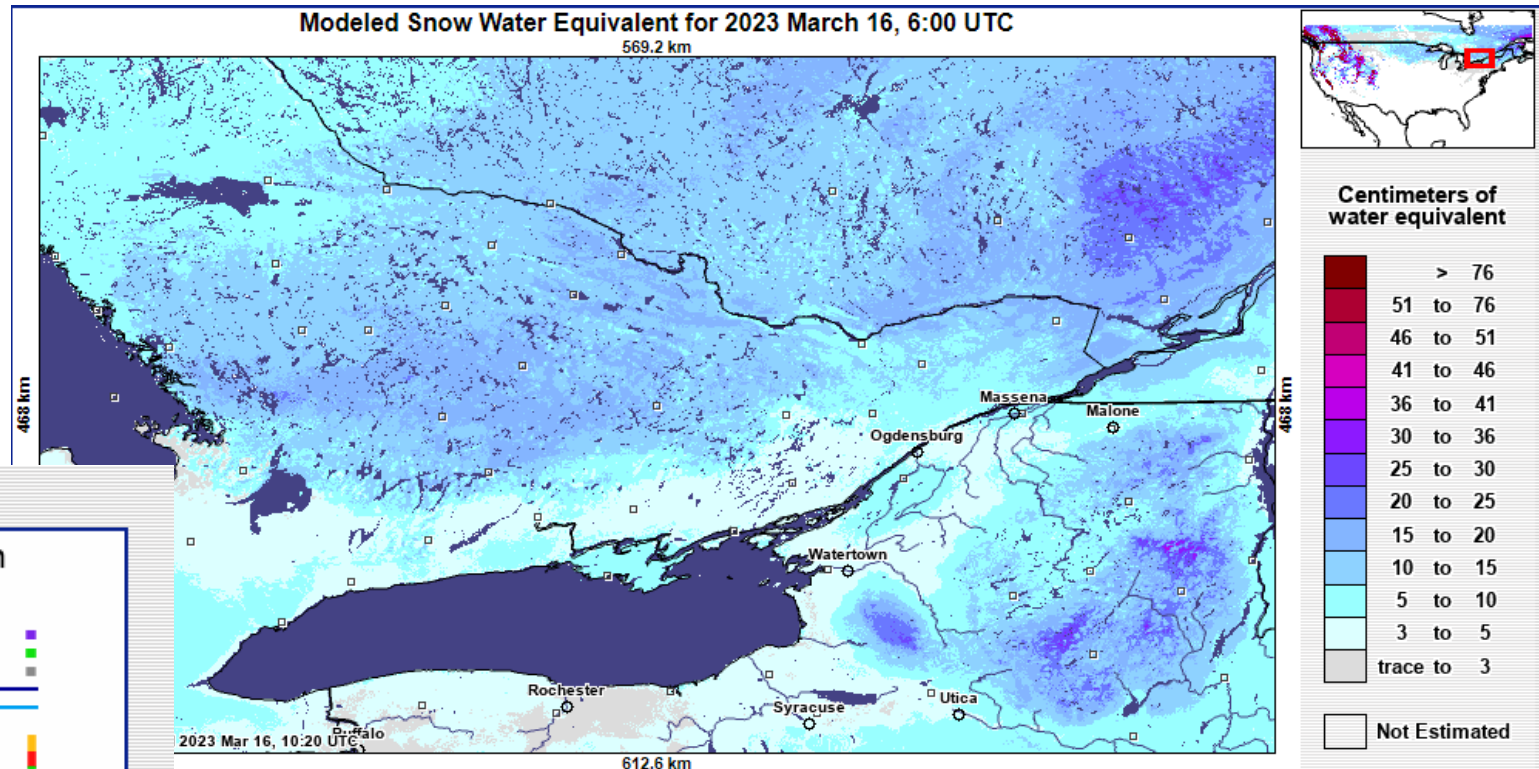


A parking lot in the area of Bank Street and Riverside Drive is flooded following Thursday's storm. Several vehicles in the parking lot are submerged in water. (Natalie van Rooy/CTV News Ottawa)



Heavy rain flooded Halifax Drive in Ottawa, with several vehicles stopped on the road. (Viewer Steve Larocque/submitted)

# Snow Cover Distribution and Peak Values

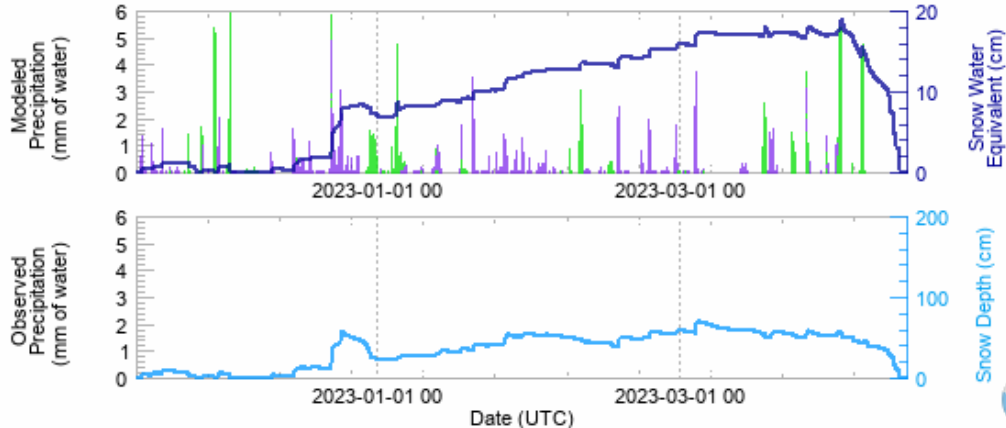


## Precipitation, Snow Water Equivalent, and Snow Depth

Modeled and Observed

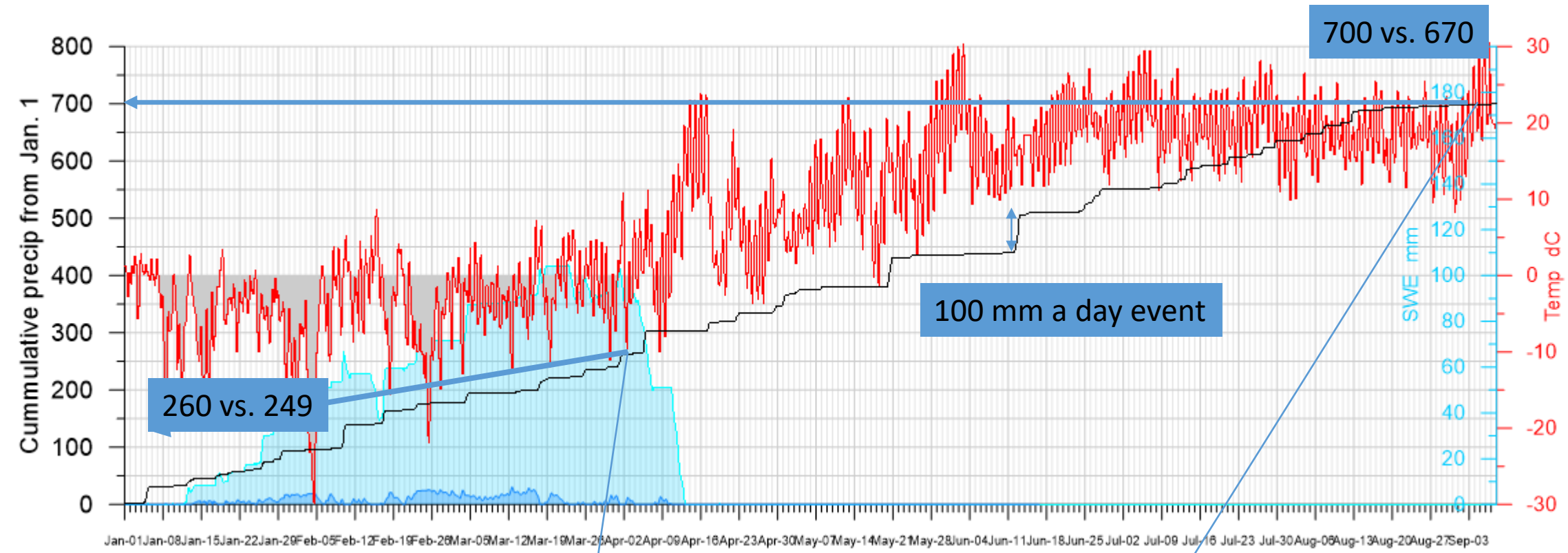
Station: D6017 MADIS - DW6017 GOODERHAM  
 Latitude: 44.91287 N  
 Longitude: 78.3745 W  
 Elevation: 338 Meters  
 Start Date: 2022-11-15 06 UTC  
 Stop Date: 2023-04-14 06 UTC  
 Forest Density: 71%  
 Land Use: Cool Mixed Forest

Snow Precipitation  
 Non-Snow Precipitation  
 Unknown Precipitation  
 Snow Water Equivalent (Modeled)  
 Snow Depth (Modeled)  
 Present Weather (Observed)  
 No Precipitation  
 Rain (Not Freezing)  
 Freezing Drizzle/Rain  
 Mixed Rain/Snow  
 Snow





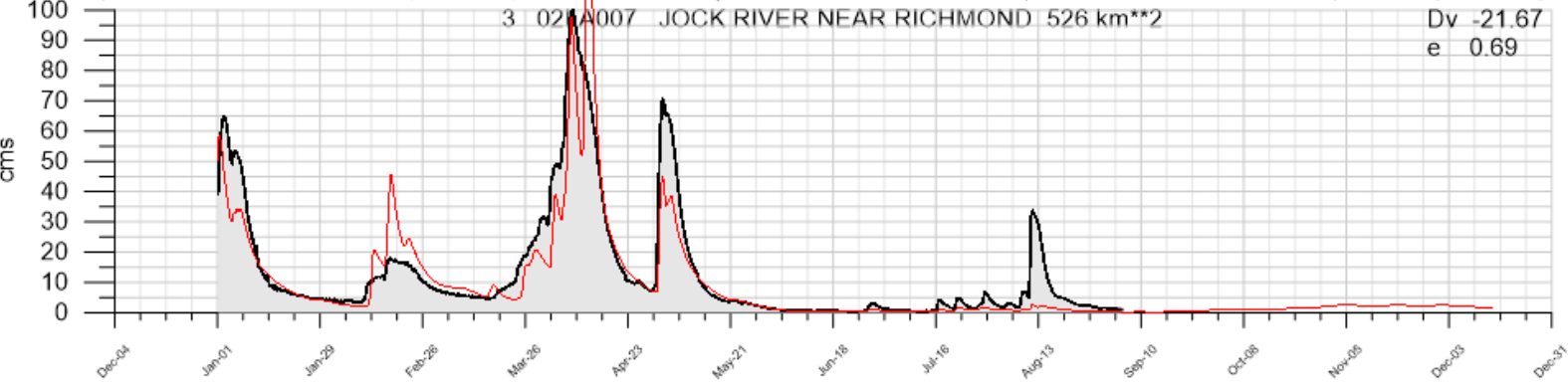
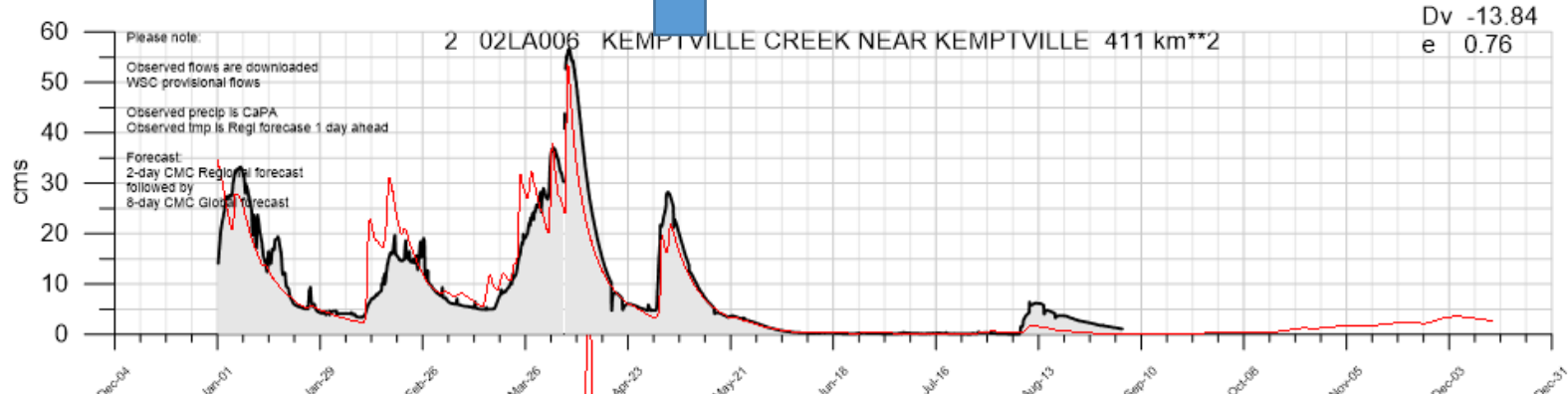
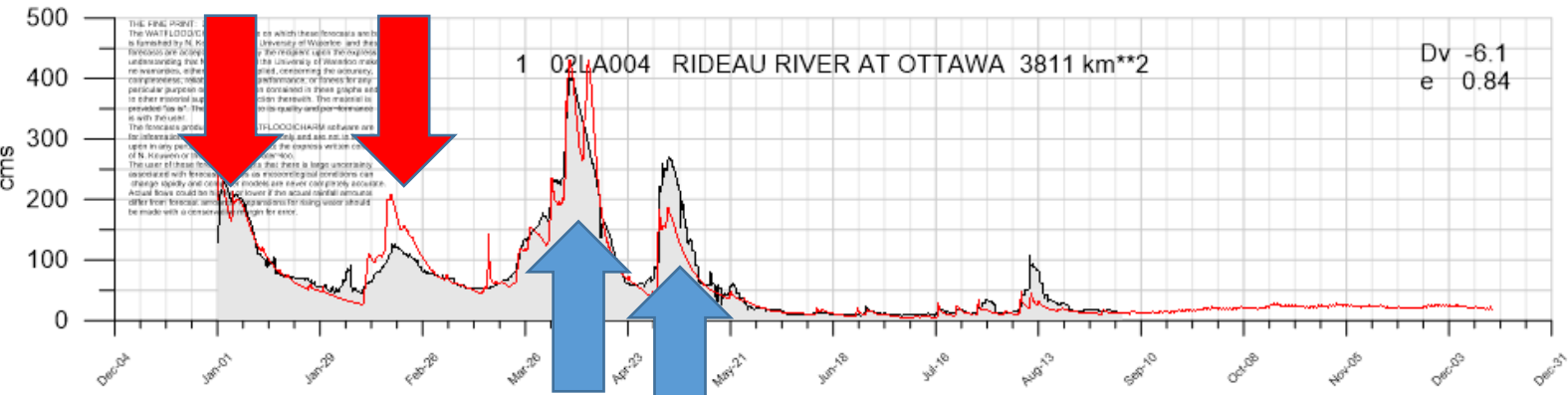
# 2023 Climatic Conditions:



1981 to 2010 Canadian Climate Normals station data

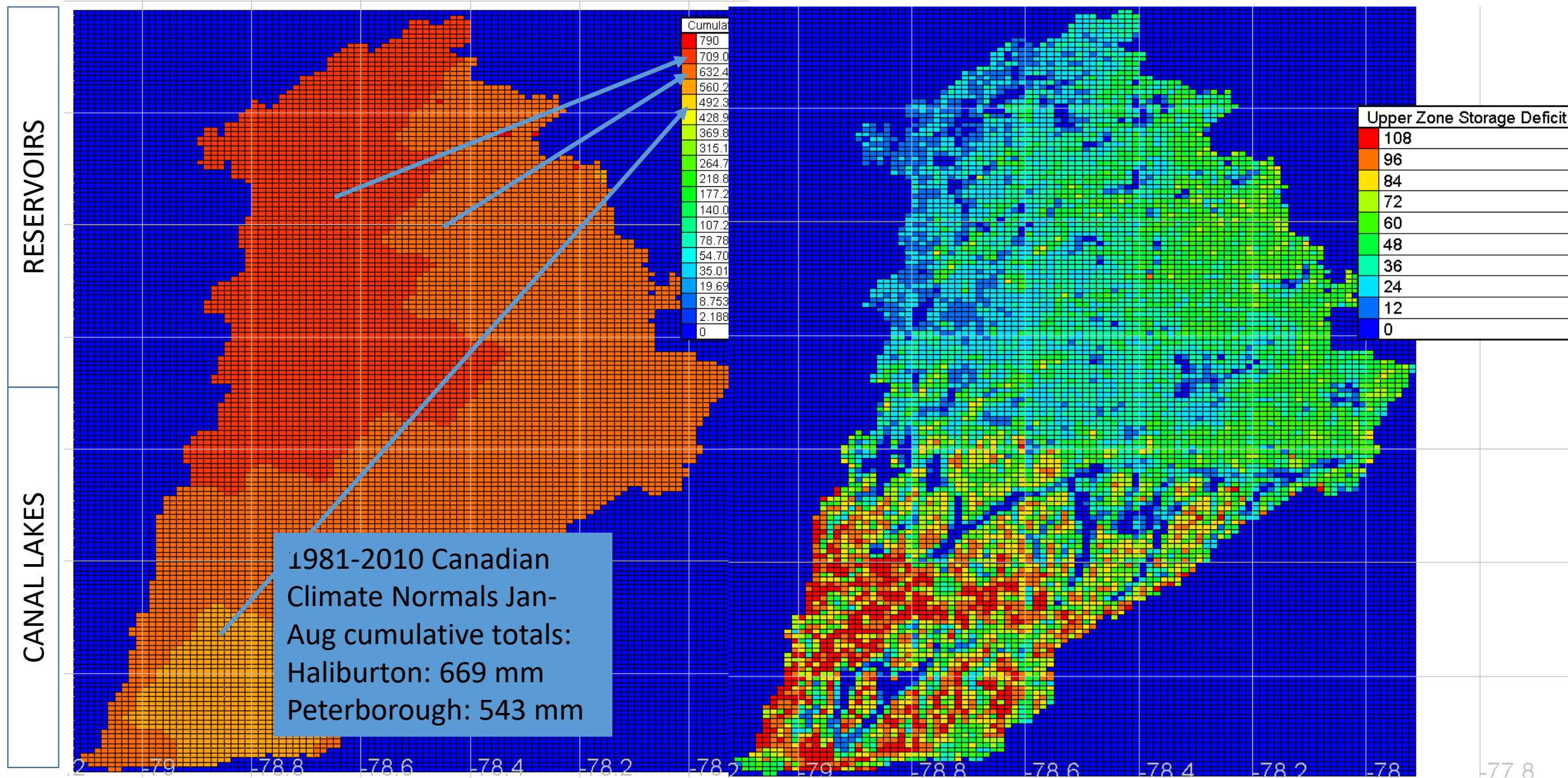
	Precipitation													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Rainfall (mm)	33.7	21.2	37.4	56.1	90.8	81.2	90.1	79	100.2	93.1	83.4	27.7	793.9	<a href="#">D</a>
Snowfall (cm)	66.9	52.7	37.9	19.4	2.5	0	0	0	0.1	7.1	32.9	60.1	279.6	<a href="#">D</a>
Precipitation (mm)	100.6	73.9	75.4	75.6	93.3	81.2	90.1	79	100.2	100.2	116.4	87.7	1073.5	<a href="#">D</a>
Cumulative PPT	100.6	174.5	249.9	325.5	418.8	500	590.1	669.1	769.3	869.5	985.9	1073.6		

# Events Unseasonal in Nature: Rideau Canal example

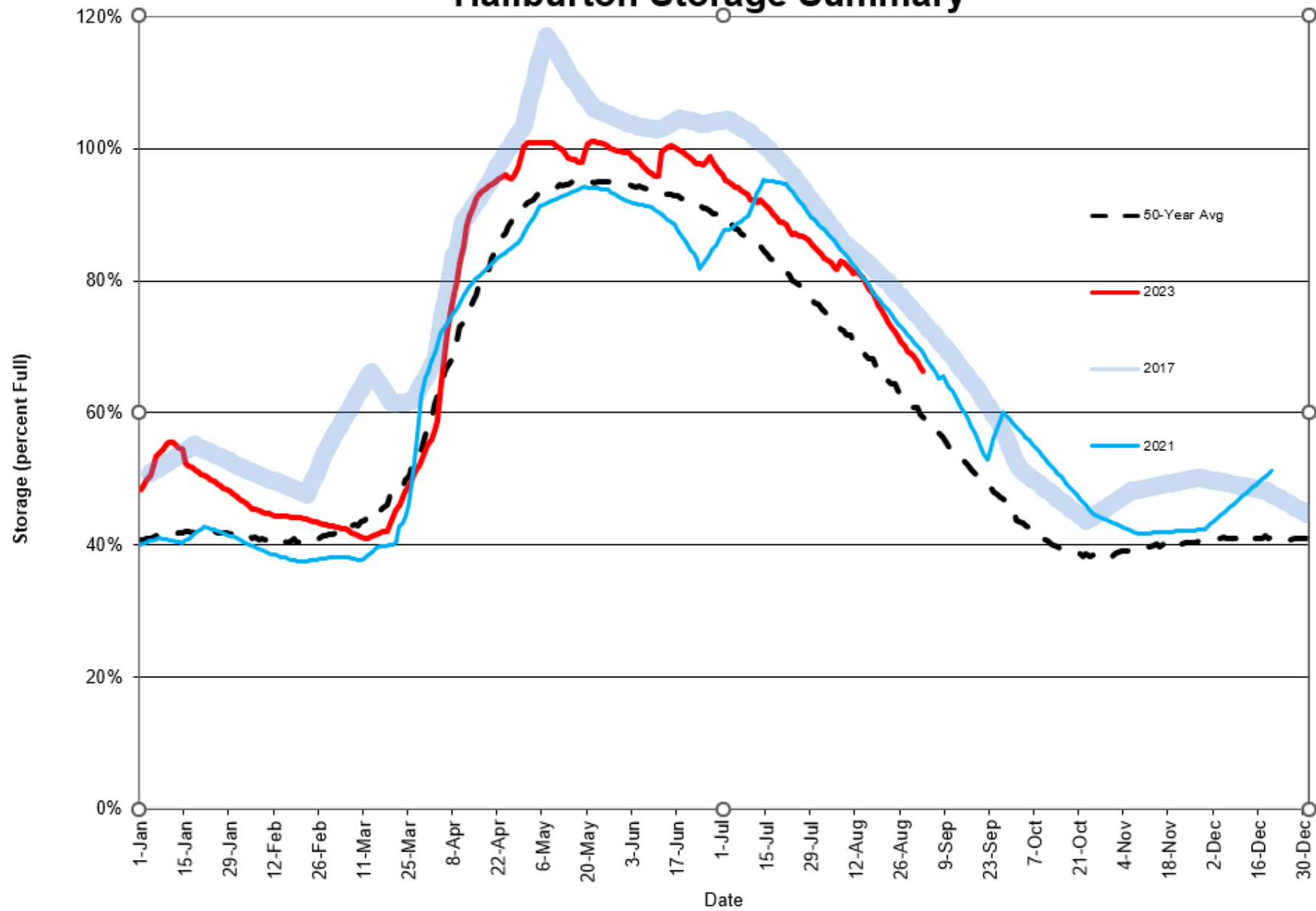




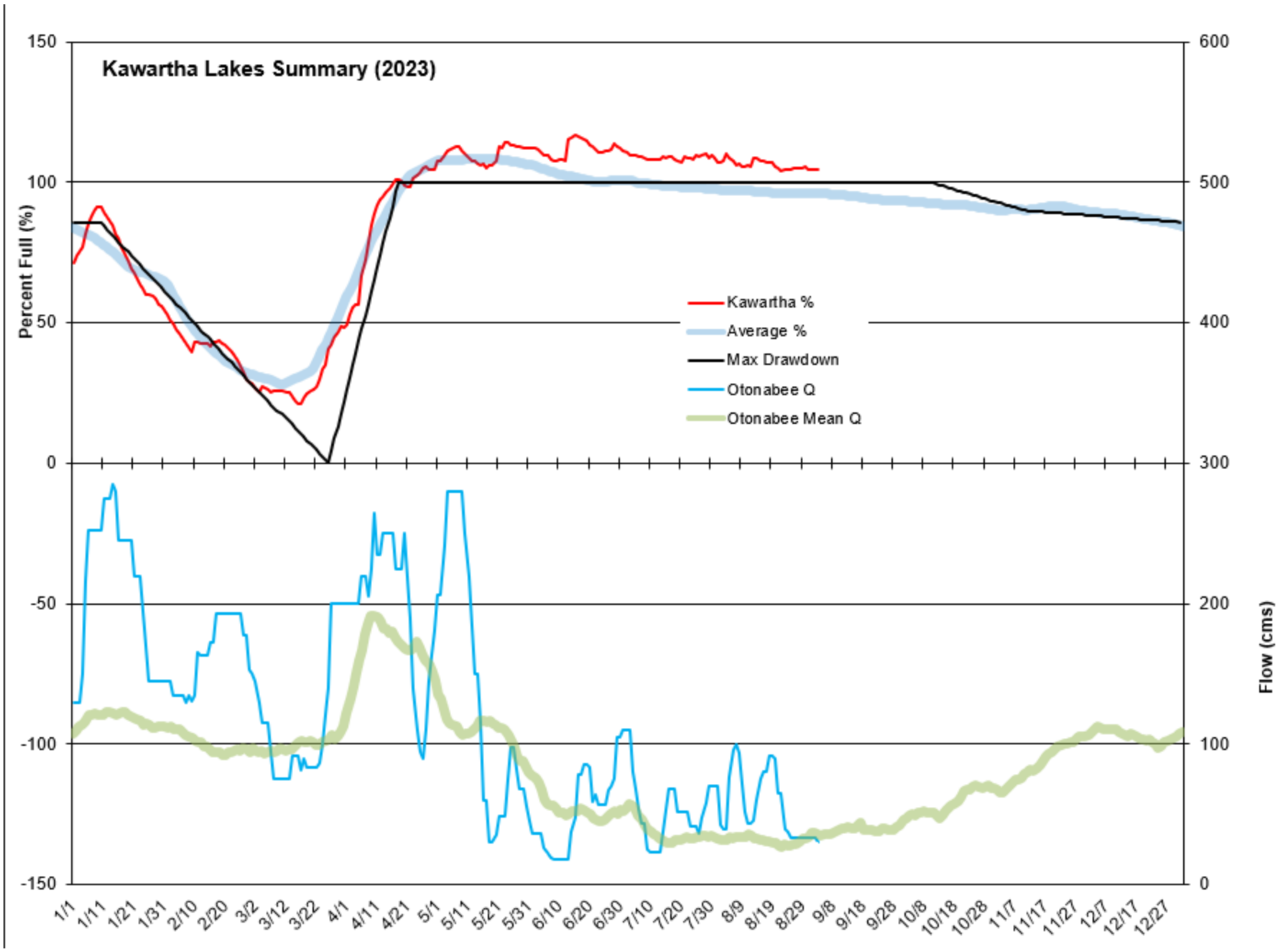
# Precipitation and Storage Spatial Distribution 2023



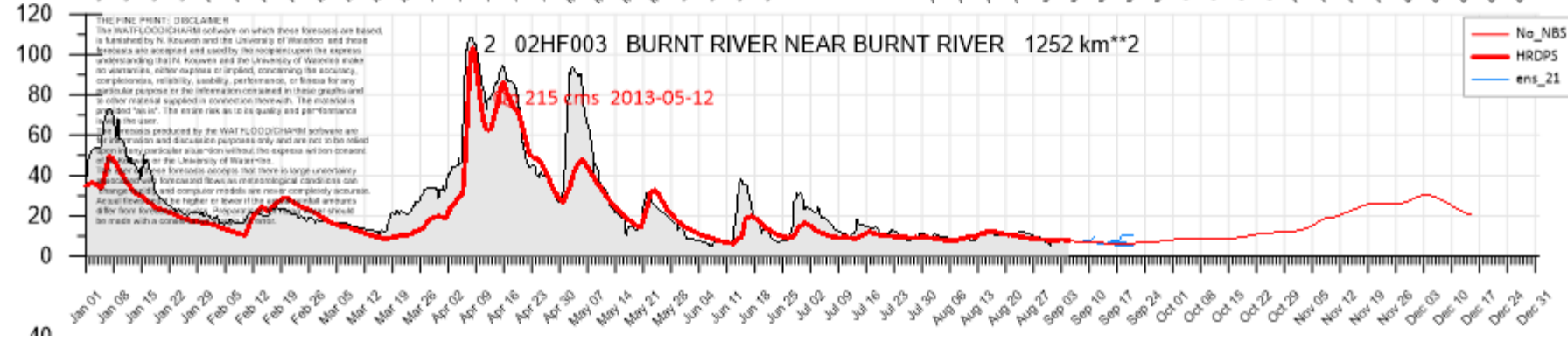
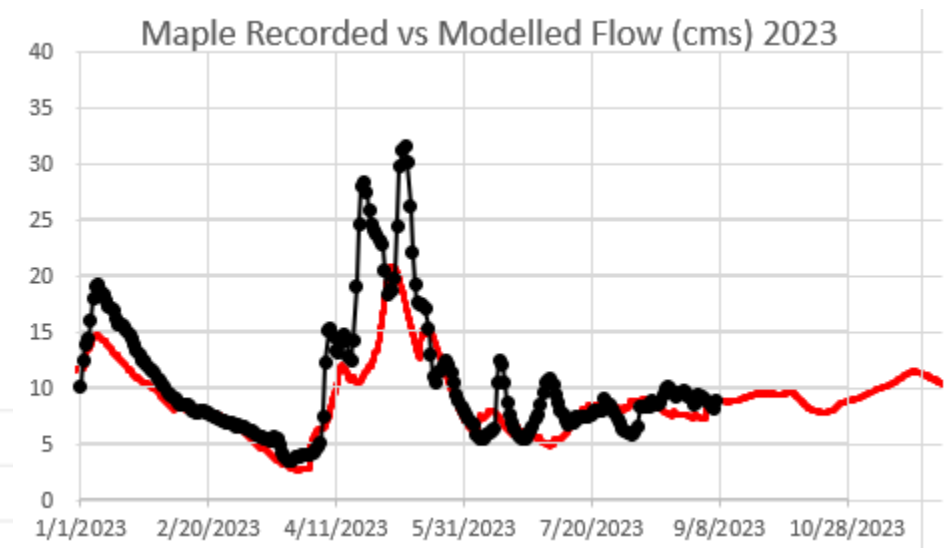
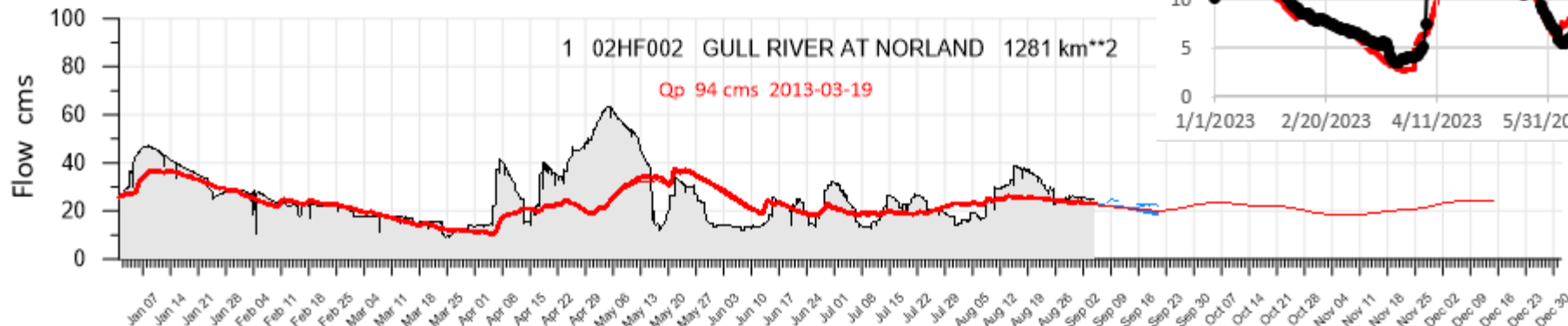
# Haliburton Storage Summary







# 2023-09-09 outlook: historic averages



## We are currently entering a warm phase called El Nino.

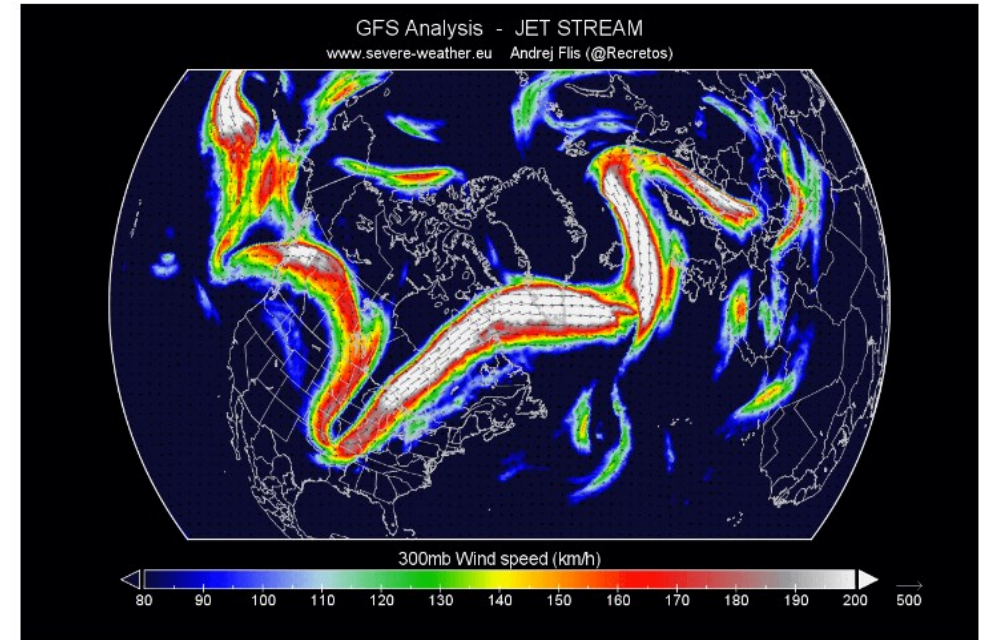
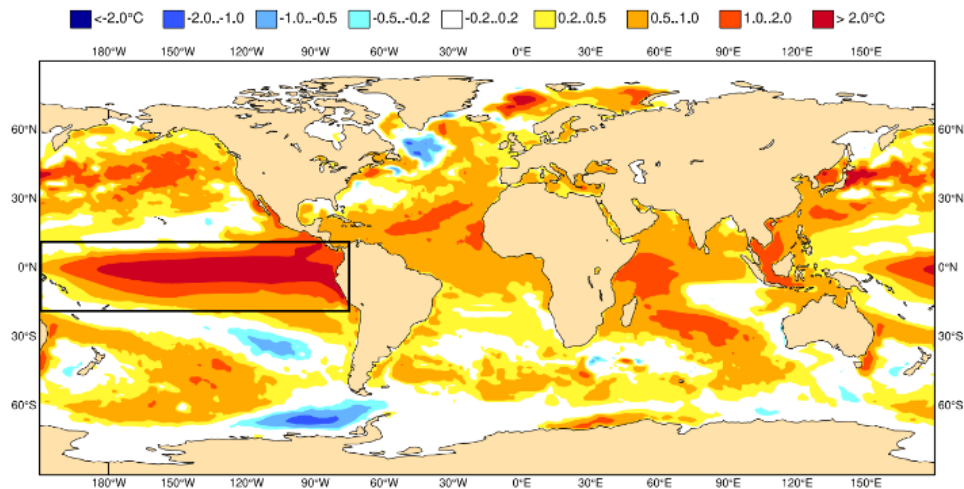
During an El Nino, rising air in the eastern Pacific causes more storms and precipitation and lowers the pressure over that region. At the same time, the air is descending in the western Pacific, causing stable weather and high-pressure conditions.

Looking at the Winter 2023/24 ocean forecast by the ECMWF, you can see a strong El Niño event expanding across the entire tropical Pacific. An event of this magnitude is strong enough to have a profound atmospheric response worldwide. A stronger impact is expected in the Winter season of the Northern Hemisphere.

ECMWF Seasonal Forecast  
Mean forecast SST anomaly

Forecast start is 01/08/23, climate period is 1993-2016  
Ensemble size = 51, climate size = 600

System 5  
DJF 2023/24



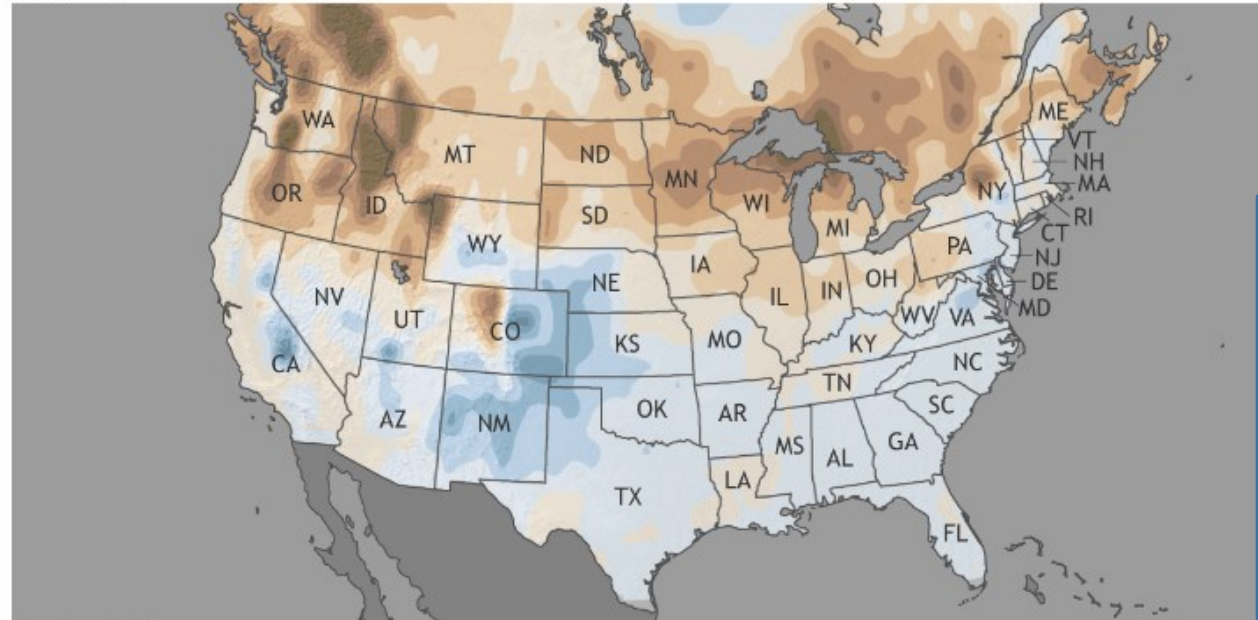
The jet stream is a very important piece of the Winter story. It is one of the main ways El Niño can change the weather patterns more directly, especially over North America.

During the El Niño winter season, there is typically a strong and persistent low-pressure area in the North Pacific. That pushes the polar jet stream further north, bringing warmer-than-normal temperatures to the northern United States and western Canada.

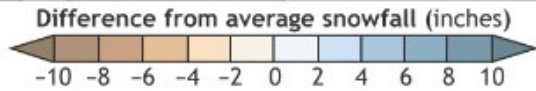


### Snow during El Niño winters (1950–2009)

All events



October–April  
compared to 1950–2009



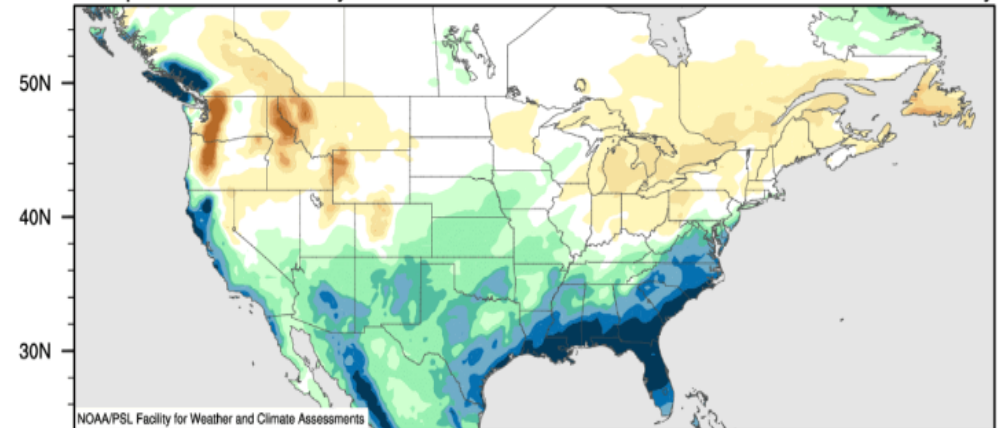
NOAA Climate.gov  
Data: Rutgers/Cf

This is mainly due to low-pressure systems trailing across the southern United States. With more moisture available, the chances of snowfall increase in the southern half of the country. But a lot depends on the availability of the cold air from the north.

Precipitation-wise, an average El Niño winter brings more precipitation to the southern half of the United States, especially in the Southeast. However, drier winter conditions prevail in the northwestern United States and around the Great Lakes.

### ERA5 reanalysis ensmean Dec-Feb 1983 1987 1992 1998 2003 2005 2007 2010 2015 2016 2019

Precipitation rate Anomaly mm/day



120W 90W 60W

-0.63 -0.49 -0.35 -0.21 -0.07 0.14 0.28 0.42 0.56 0.7

Anomaly relative to 1981–2010 average



# Thank you

