AN ENVIRONMENTAL PRIMER

Canadian Domes of Moisture Emissions Major Drivers Melting Greenland's Glaciers

By

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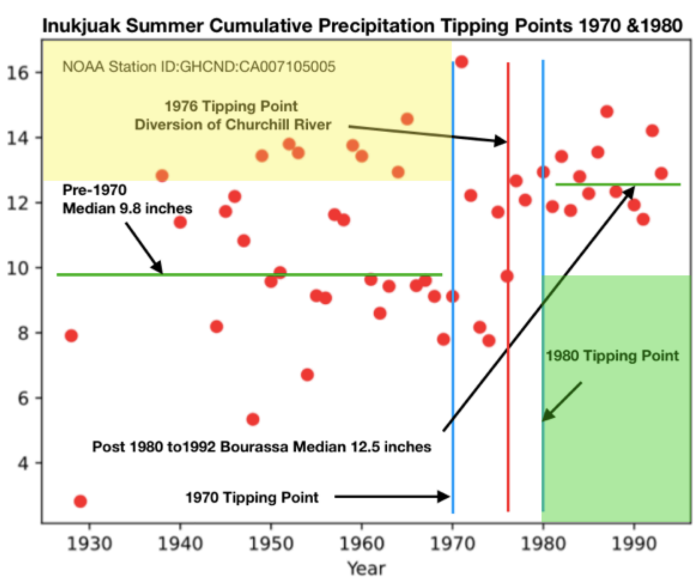
Abstract

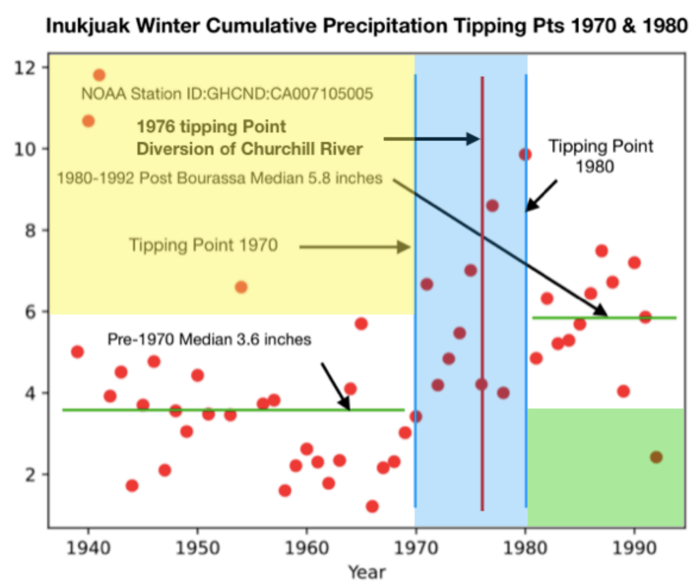
Weather stations, located upwind from southwest Greenland, document an extreme tipping point in 1993 along with earlier ones in 1970 and 1980. These tipping points coincide with the building of Arctic mega power stations (AMPSs) in Manitoba's Nelson River and Quebec's James Bay Hydroelectric Projects between 53 and 57 degrees North. It appears that the 1949 Soviet hypothesis to use water vapor emissions, a powerful greenhouse gas, to increase atmospheric humidity has also come to fruition in northern Quebec with the buildup of these AMPSs and their resulting domes of moisture emissions (DOMEs) in Hudson Bay's watershed. The weather data provides compelling evidence corroborating the Soviet hypothesis of a causal relationship between the summer evaporation from AMPs colossal reservoirs and my hypothesis that the summer and winter evaporation from the regulated discharges is another major driver increasing precipitation and temperatures. The fact that the 1993 Brisay AMPS and Caniapiscau Reservoir are both upwind and in such close proximity to Greenland, makes their summer and winter DOMEs the driving mechanisms warming the region and melting Greenland's glaciers and raising sea levels. This extreme 1993 tipping point began with the 1985 diversion of an estimated 45 percent of the waters of the north flowing Caniapiscau River into the west flowing La Grande River. The 1993 Brisay AMPS regulates the discharge of Caniapiscau Reservoir water, which now flows through the 5 AMPSs and 2 HPPs downstream on the La Grande. This has greatly magnified the "positive feedbacks" of the moisture laden atmospheric blankets created by the summer and winter DOMEs from each of these 7 hydroelectric facilities.

The impacts of “positive feedbacks” from climate forcings of Arctic mega powerstations (AMPSs) and hydropower plants (HPPs) downstream of the AMPSs on Hudson Bay and Russian Rivers have historically not been well documented by the scientific community, which this Primer seeks to rectify. A “*climate feedback*” is defined by **NASA**, **Global Climate Change, Vital Signs of the Planet** as: *“a process that can either amplify or reduce the effects of climate forcings. A feedback that increases an initial warming is called a ‘positive feedback’. A feedback that reduces an intial warming is a ‘negative feedback’ ”.*

Climate forcing began in the Hudson Bay and Labrador Peninsula regions with the 1970 and 1980 storing of the Nelson and Bourassa spring freshets in AMPS’s reservoirs. Solar energy was absorbed by the reservoirs in the summer and the relatively warm stored water was released downstream to generate winter hydropower. This warmer water resulted in three warming “positive feedbacks”. The first was a man-made phenomena of year round flowing rivers during the very arid and frigid Arctic winters. The second was forced winter water vapor emissions, a powerful greenhouse gas, from the ice free sections of the warmed rivers and downstream estuaries and coastal seas. The third was new forced summer (May-October) water vapor emissions from the gigantic human made inland seas

Notable findings following construction of the AMPSs include the rapid increase of summer precipitation. The first tipping point was in 1970 on the Nelson River, when Manitoba Electric commissioned the Kettle AMPS, creating Stephen Lake Reservoir, which is 625 miles west of the Inukjuak weather station on the east shore of Hudson Bay (See Map on next page). The second was in 1976,when they diverted 85 percent of the Manitoba’s north flowing Churchill River into the Nelson River, increasing the Nelson’s mean discharge into Hudson Bay by 40 percent. The third was Hydro Quebec comissioning the 1980 Robert Bourassa AMPS on the La Grande River.





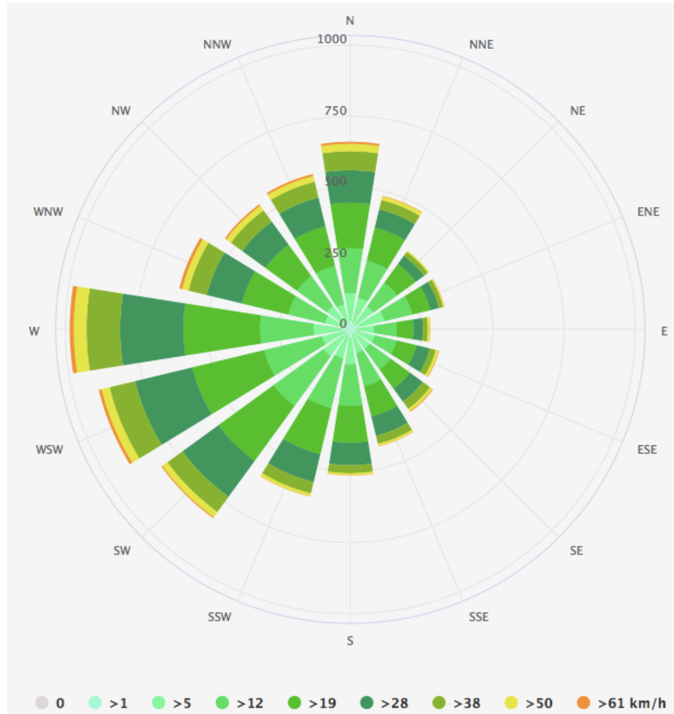
Canada’s Labrador Peninsula and the southwestern Coast of Greenland Are The Tailpipes for Forced Water Vapor Emissions from Hudson Bay Dams

Source: www.freeworldmaps.net

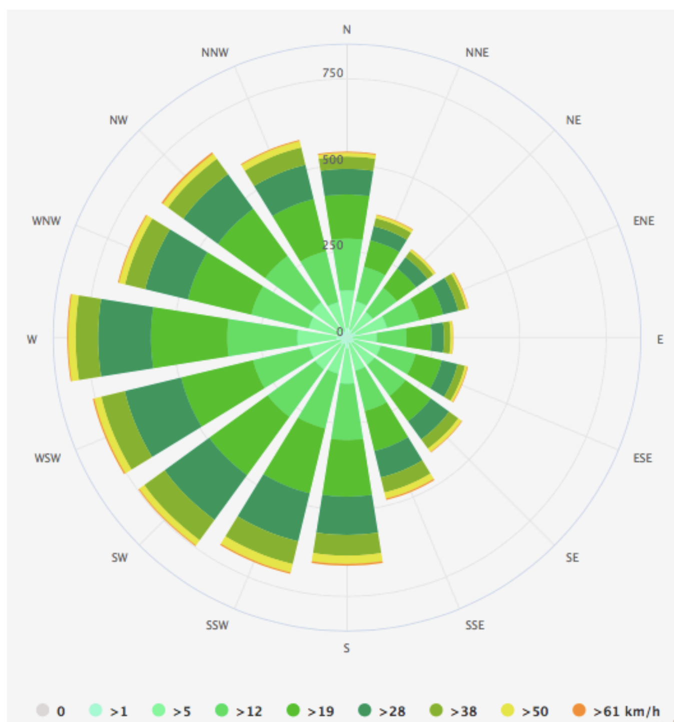
The Nelson’s and Brisay’s forced summer and winter water vapor emissions and their thermally warming humidity are readily transported by the prevailing west and southwesterly winds across Hudson Bay and the Labrador Peninsula and Sea to Greenland’s western shore and north to Ellsmere Island. (See Wind Roses on page 5)

Wind Roses

A wind rose shows how many hours per year the wind blows from the indicated direction.



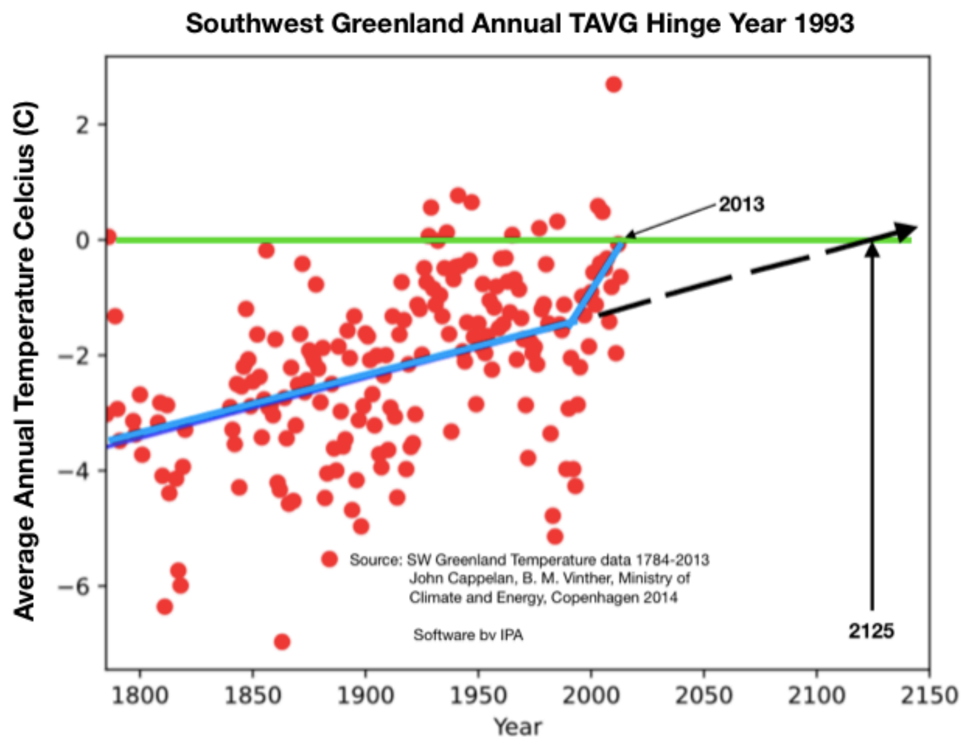
Kuujjuaq weather station- Point 3 on Map 1 on page 4



Radisson weather station- Below point 1 and next to Bourassa AMPS

After the 1993 Brisay AMPS was built, the southwest Greenland average annual temperature rose 1.5 degrees Celsius (C) over the next 20 years to 0 degrees C, compared to a rise of only 2.1 degrees C over the previous 204 years. Extrapolating the historic trend line shows it would have taken more than 100 years after 1993 for the temperature to reach 0 degrees C.

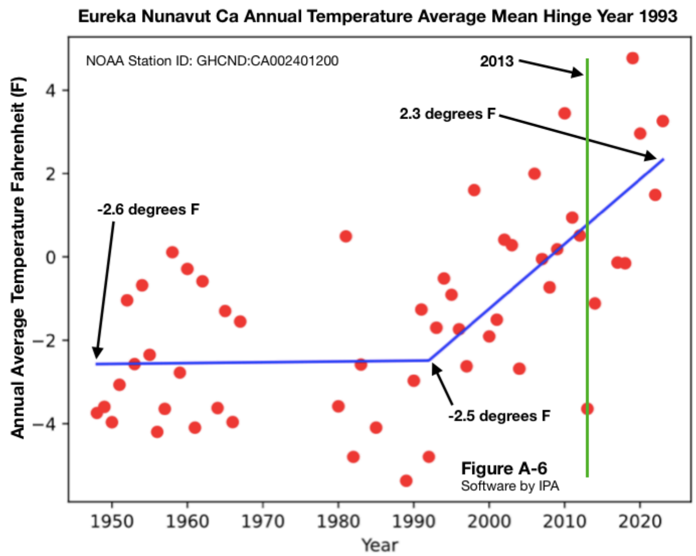
The public availability of data from the Inukjuak weather station ceased in 1993, but there is 204 years of temperature data for southwest Greenland.



1784 to 2013 Average Annual Temperature Trend Line
1993 to 2125 Extrapolation of 1784-1993 Trend Line

The Brisay hydroelectric AMPS is located about nine hundred miles to the southwest of the Greenland weather stations. It is my hypothesis that evaporation from the regulated and relatively warm discharged AMPS' waters and its 1,700 square mile reservoir has created forced water vapor emissions, which form a moisture laden atmospheric warming blanket extending over northern Quebec and across the Labrador Sea to southwest Greenland.

Eureka weather station is on Ellesmere Island in Nunavut, Canada and its data reveals an abrupt and extreme annual warming trend of 4.8 degrees Fahrenheit (F) since 1993. Ellesmere Island is shown at the top of the Map on page 4.



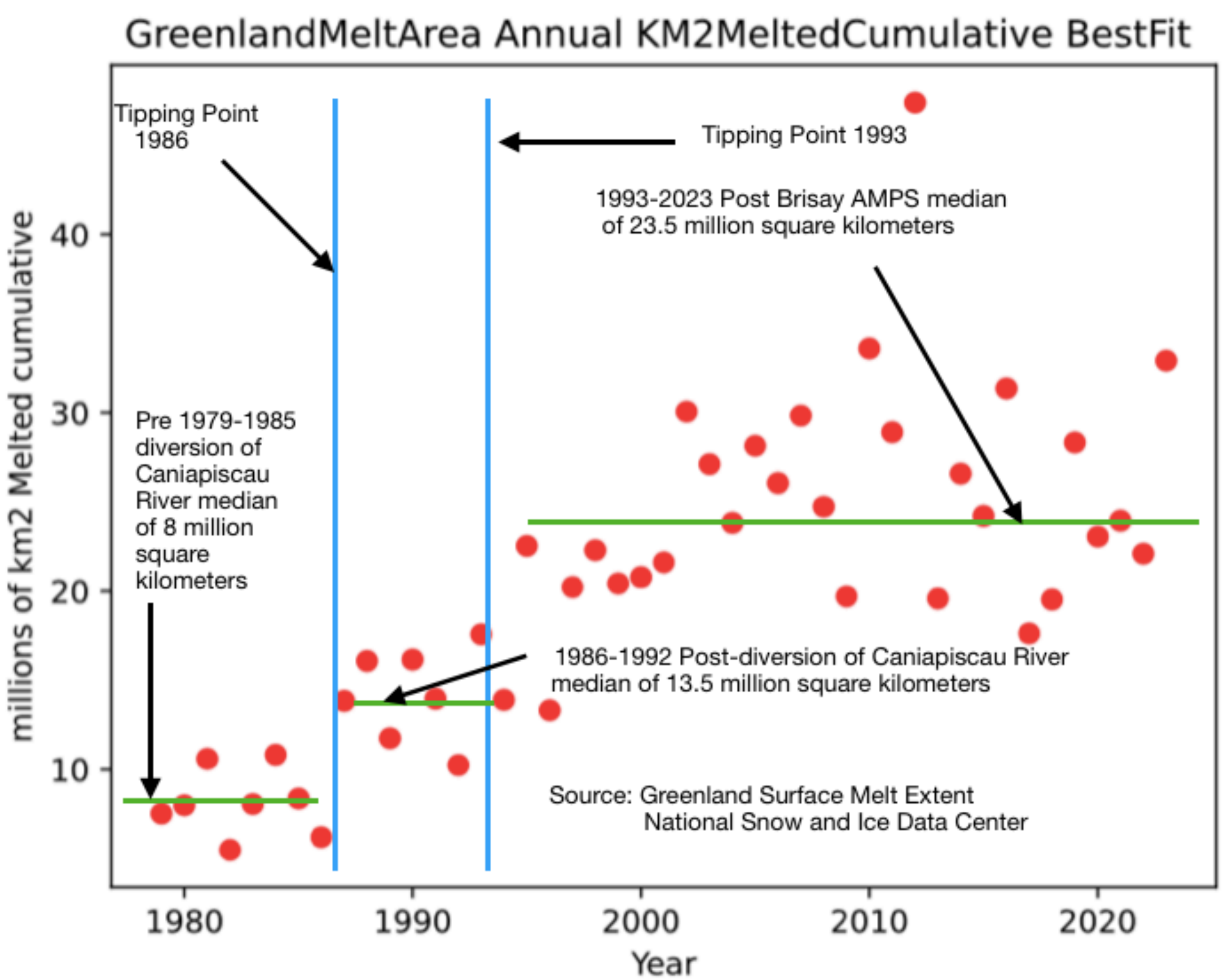
The temperature data in my graphs for southwest Greenland, Kuujjuarapik and Kuujjuaq end in 2013. Eureka's data goes through 2022 and shows a continuing escalation of the warming trend. Eureka's warming trend was documented in an **ARCTIC TODAY** article, "*With warming temperatures, Canada's Arctic glaciers are melting faster, Researchers in two separate studies documented dramatic changes beginning in the 1990s after decades of stability."* by Hannah Hoag, July 13, 2018

In one study, Adrienne White, from the Labratory of Cryospheric Research, University of Ottawa said: *"A rise in air temperature has contributed to the glacial melt. On average, temperatures in the region have increased 0.5 degrees Celsius (0.9 degrees Fahrenheit) per decade since the 1940's. But there was a strong shift in the mid-1990s, when the mean annual temperature increase accelerated to 0.74C (1.3F) per decade from 0.12 (.22F). The average summer air temperature shifted to above freezing from below freeziing since 2000.* In the other study, *"Laura Thomson of Queen's University in Kingston, Ontario, detailed the findings of four reference glaciers in the Canadian Arctic, the Meighen Ice Cap, Melville Ice Cap and White Glacier, on Axel Heiberg Island.*

Researchers have made annual measurements of three icecaps and one mountain glacier on four islands in the Canadian Arctic since 1960. The four reference glaciers remained relatively stable until the 1990's. Then we saw large swings said Thomson. The summer melt of these four glaciers has increased more than five-fold in some years since 2005"

Data from NASA's National Snow and Ice Data Center documents huge increases in Greenlands's surface melt extent which coincide with the August 1985 diversion of the Caniapiscau River and 1993 commissioning of the Brisay AMPS.

Post Brisay, Greenland's surface melt extent increased three fold and global mean sea level has risen 3.98 inches in 30 years (National Snow and Ice Data Center). This tipping point in sea level escalation was preceded by a rise of only 4 to 5 inches in mean sea level between 1900 and 1992 (**NASA Tracking 30 Years of Sea Level Rise**). Since the Brisay was commissioned, global mean sea level has risen almost 4 times faster than the historic rate.

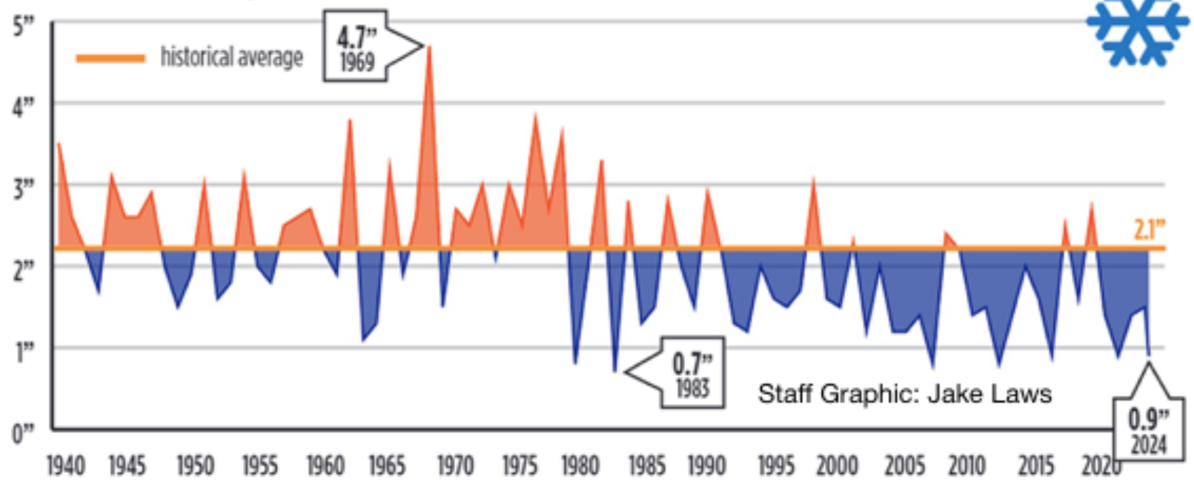


Notes: From 1979-86 and part of 1987, the recorded data in the National Snow and Ice Center is missing data for every other day due to alternate day satellite tracking over Greenland. In order to use this data set, we assumed the melt extent on the days not recorded was the same amount recorded on the previous day.

The footprint of the 1993 Brisay AMPS's tipping point is readily apparent on these two Maine weather graphs.

Maine's shrinking snowpack

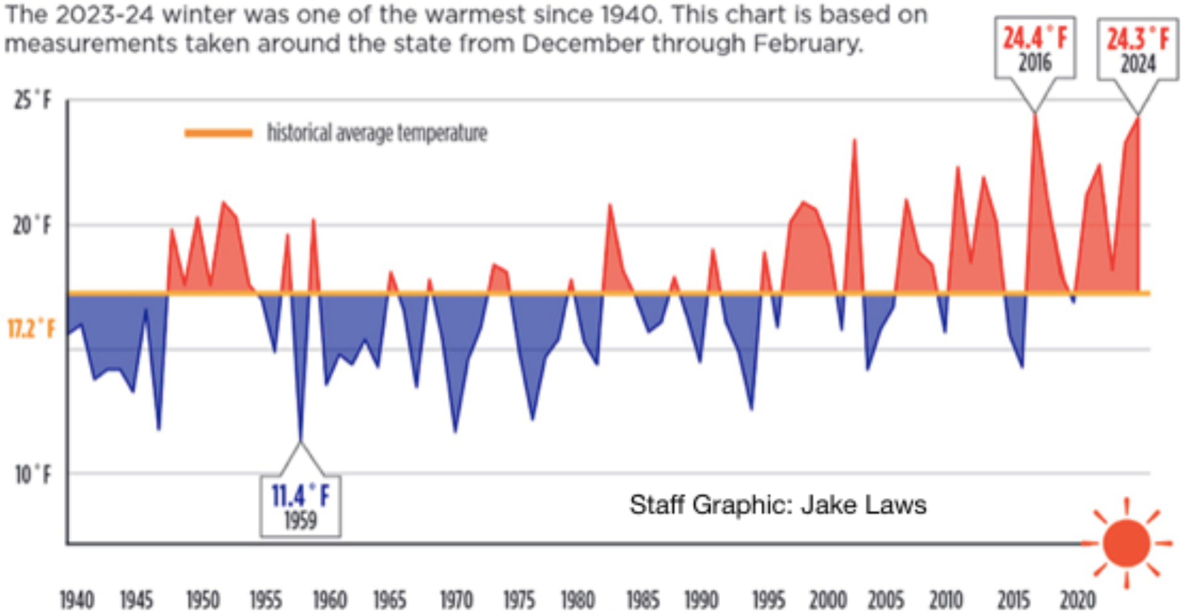
The 2023-24 winter was one of the least snowy in Maine since 1940. The chart is based on measurements taken around the state from December through February. Snow depths are measured in water equivalent because snow density varies. On average, one inch of water equals about 10 inches of fluffy snow.



Source: Climate Change Institute; University of Maine - Maine Sunday Telegram March 31, 2024

Maine's warming winters

The 2023-24 winter was one of the warmest since 1940. This chart is based on measurements taken around the state from December through February.

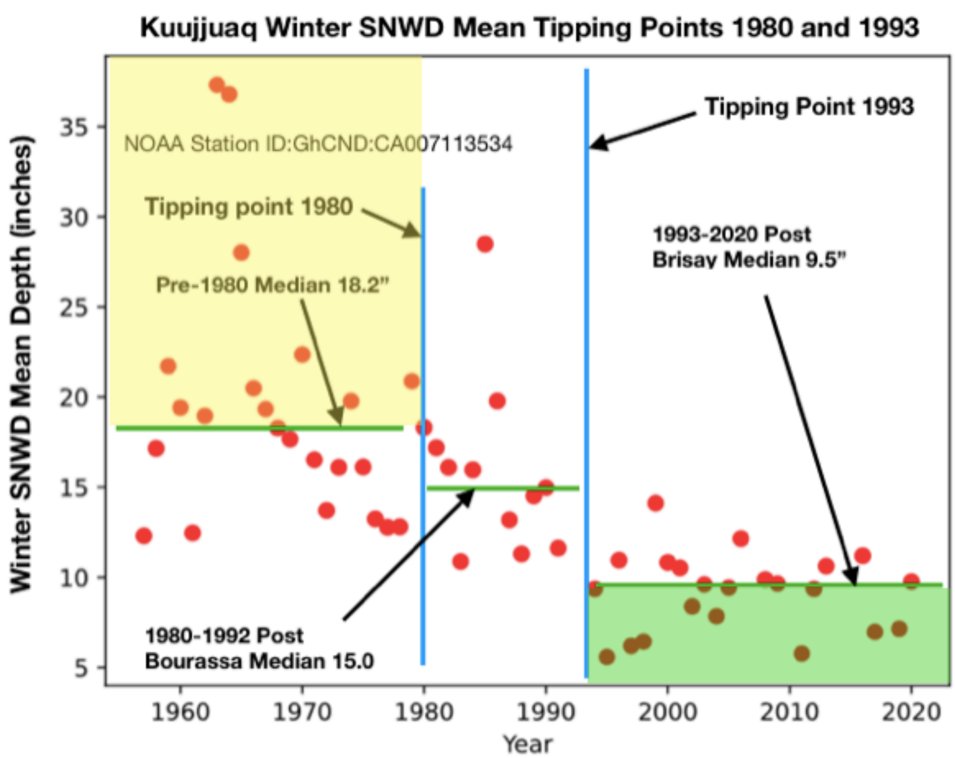


Source: Climate Change Institute; University of Maine   Maine Suday Telegram March 31, 2024

The 1980 Bourassa and 1993 Brisay winter DOMEs caused an immediate and drastic reduction in snowpack depths in northern Quebec.

Snowpack depths were taken from NOAA's daily Record of Climatological Observations and are the amount of snow, ice pellets, hail and ice measured on the ground in inches. Kuujjuaq's historic snowpack depth pre-1980 median has declined by about 50 percent for the post 1993 Brisay AMPS and it has never recovered. This data set covers 1957-2020 and there is no data after 2020. Kuujjuarapik's data collection ended in 2013. The discontinuance of collecting and/or releasing data from these weather stations is very concerning during the accelerating climate change of the past 30 years.

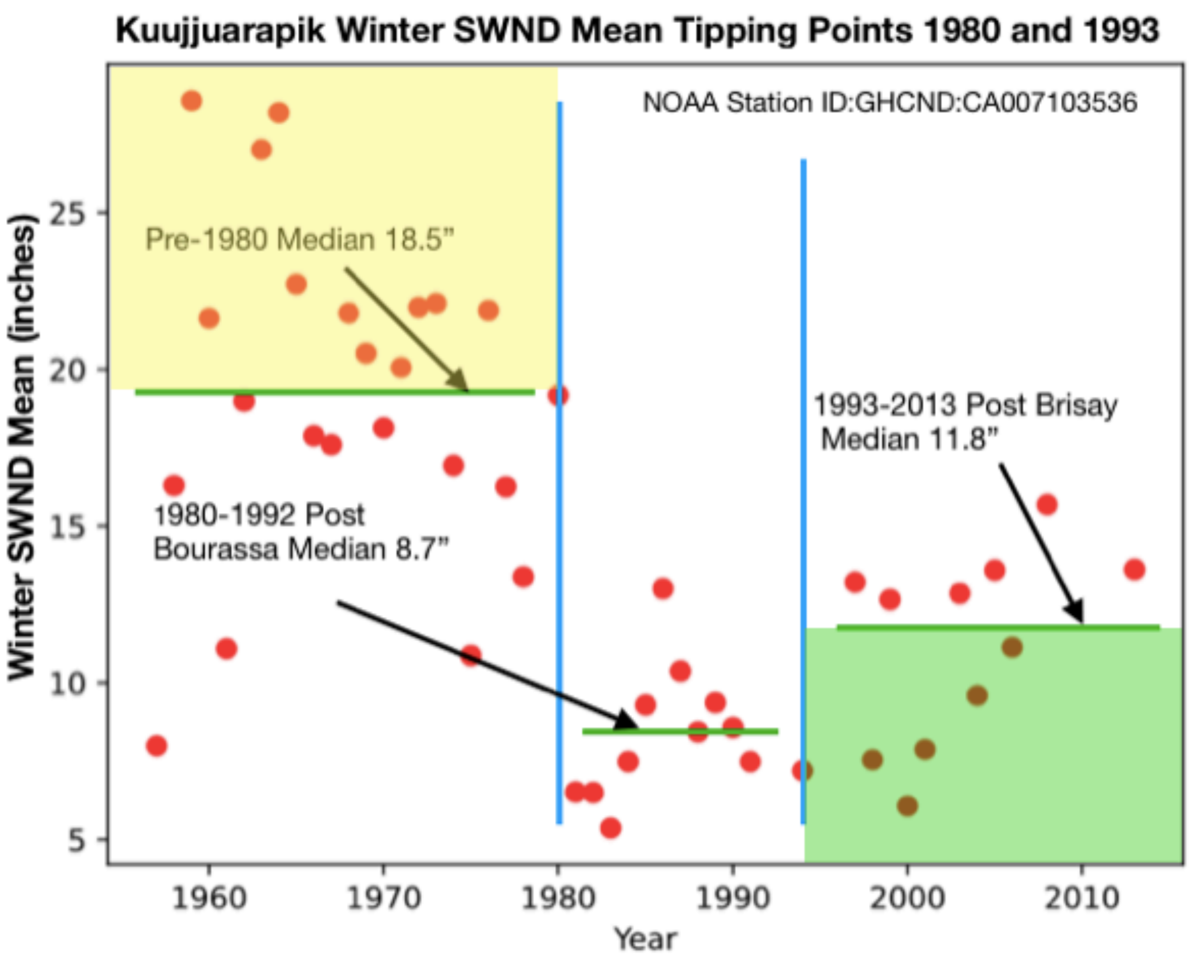
The prevailing winds across the Labrador Peninsula facilitate the transport of an immense volume of forced water vapor emissions from the winter evaporation 24/7 from these Canadian AMPSs across the Labrador Peninsula and over Hudson Strait and the Labrador Sea to Greenland. Throughout the winter, large sections of downstream unfrozen rivers warmed by the hypolimnial dam releases, continually contaminate the atmosphere with great volumes of water vapor amplifying winter temperatures and suppressing snowpack depths. Never before in geologic history have rivers flowed throughout the Arctic winters exposing vast surface areas of unfrozen water to such strong evaporative forces.



In 1980, Hydro-Quebec commissioned the 5,616 Megawatts Robert Bourassa AMPS on the La Grande River. This AMPS is only 73 miles upstream from the mouth of the La Grande which discharges into James Bay's counter clockwise coastal currents. Kuujjuarapik weather station is situated on the east shore of Hudson Bay about 150 miles down current from the LaGrande's mouth (See Map on page 12).

Weather data from Kuujjuarapik, reveals profound and sudden decreases in the snowpack coinciding with the commissioning of the 1980 Bourassa AMPS and the long term suppression after the 1993 Brisay AMPS became operational.

The following year, after 1980, there was a sudden decline of more than 50 percent in the pre-1980 winter (Jan-Apr, Nov,Dec) snowpack depth median of 18.5 inches to 8.7 inches at Kuujjuarapik's weather station, which have not recovered to pre-dam depths highlighted in yellow.

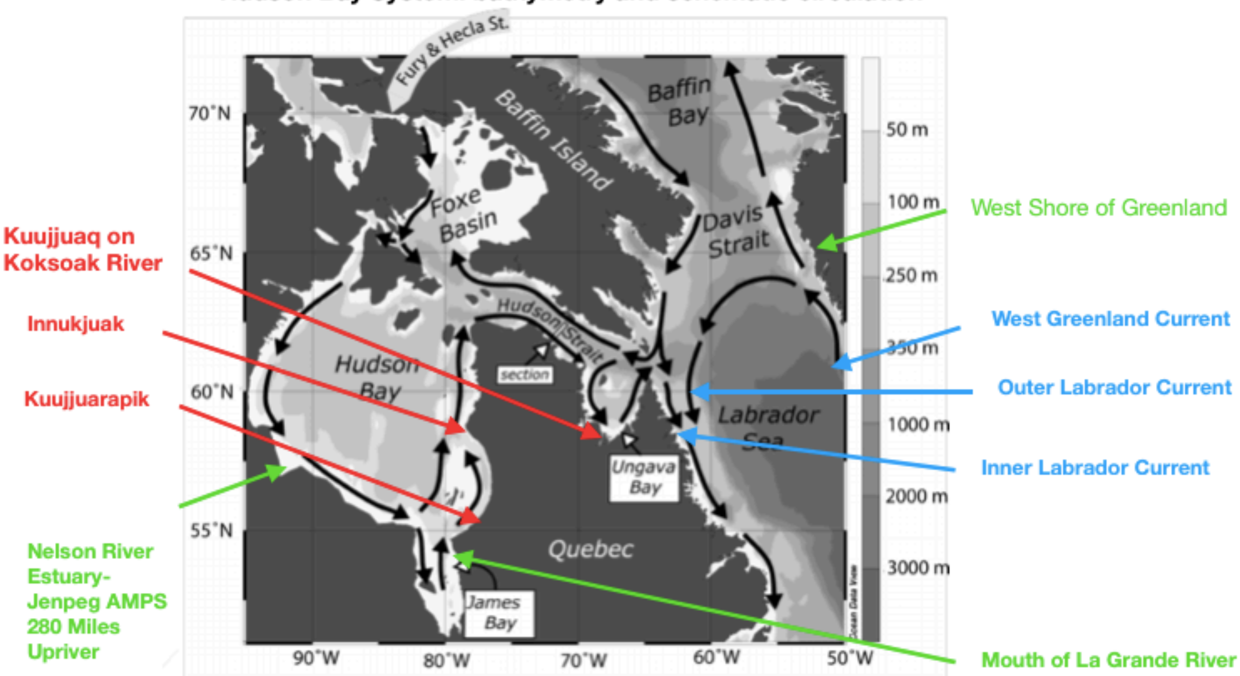


What makes Brisay such a powerful monster is the heat polluting consequences of its increased water vapor emissions driven by large relatively warm winter reservoir releases. The additional deluge of warmer winter flows is made possible by an estimated 45 percent diversion of the north flowing Caniapiscau River that once fed Ungava Bay into the La Grande and downstream through five mammoth water vaporizing AMPSs and two HPPs. Its waters now flow into the La Grande River where the regulated winter dam discharges are 8 times greater than the pre-Bourassa natural river flows into James Bay.

The LaGrande's spring freshet has been eradicated and the winter flows increased as noted below:

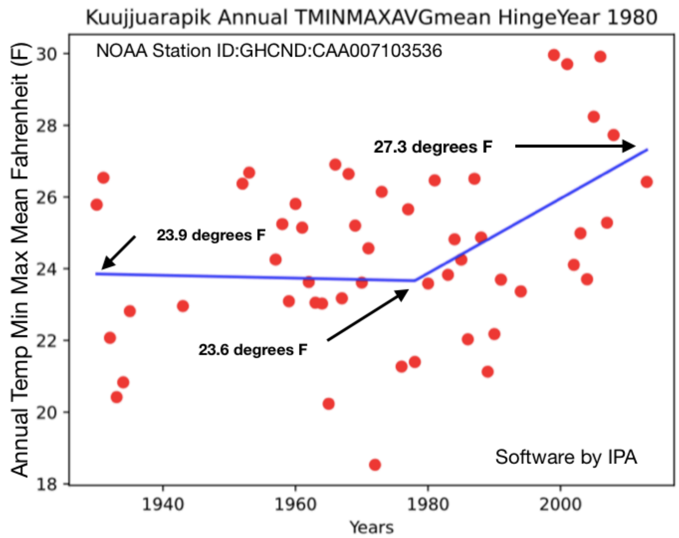
"In Quebec, peak electricity consumption occurs during the winter when river flows are naturally at their lowest because water is locked up in snow and ice. To meet the demand for electricity during cold weather, dams and diversions have increased the flow on the La Grande by 8 times (from 18,000 to 141,000 cubic feet per second) in order to store water for the following winter and have eradicated the spring flow (flow reduced from 176,000 to 53,000 cubic feet per second)"
("***La Grande Riviere: A Subarctic River and a Hydroelectric Mega Project***", Harper P.P.; "***Silenced Rivers***", McCully, P. 1996)

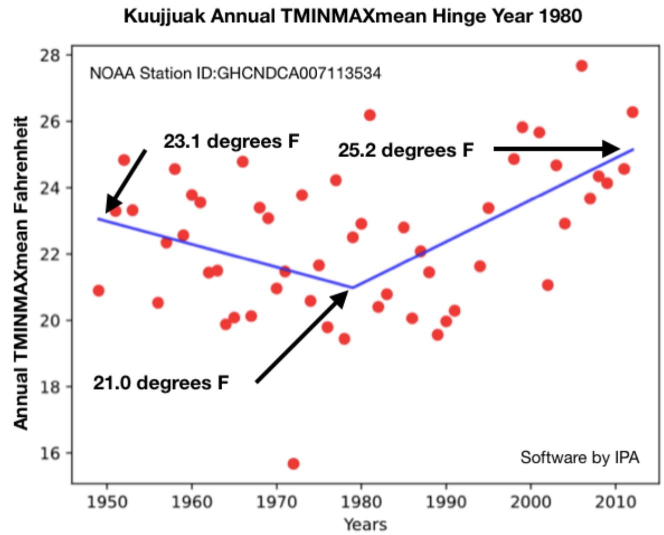
Hudson Bay System: bathymetry and schematic circulation



Source: Strange and Saucier Nov. 2007

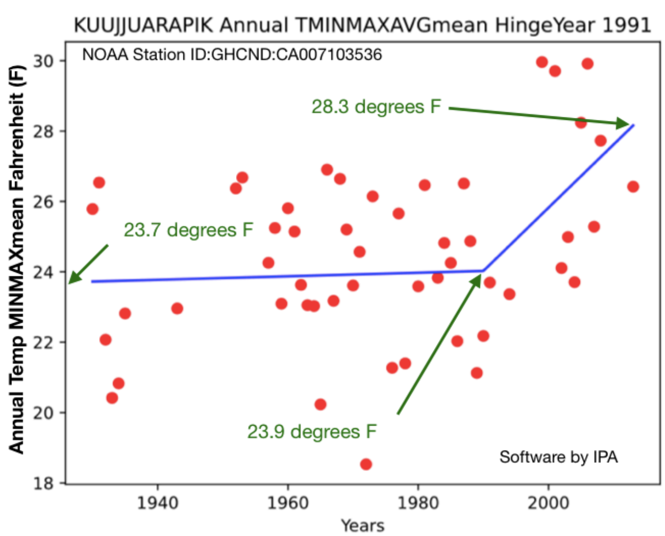
The 1980 hinge year is the year that the Robert Bourassa AMPS began operation under the ownership of Hydro-Quebec and radically reversed a half century cooling trend at Kuujjuak.

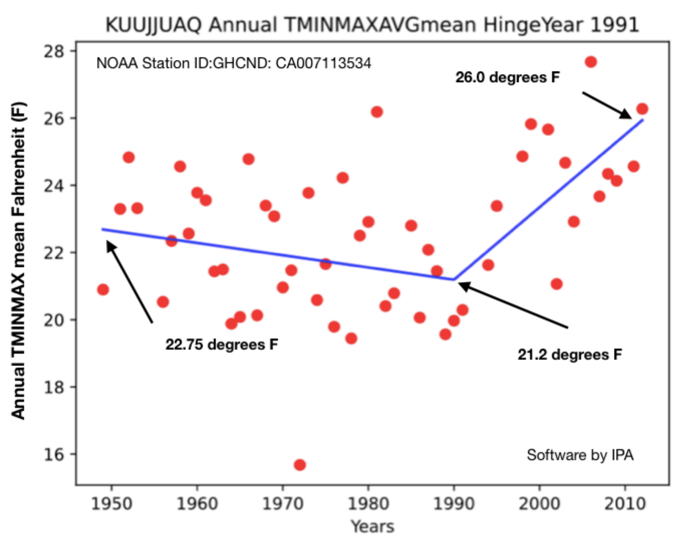




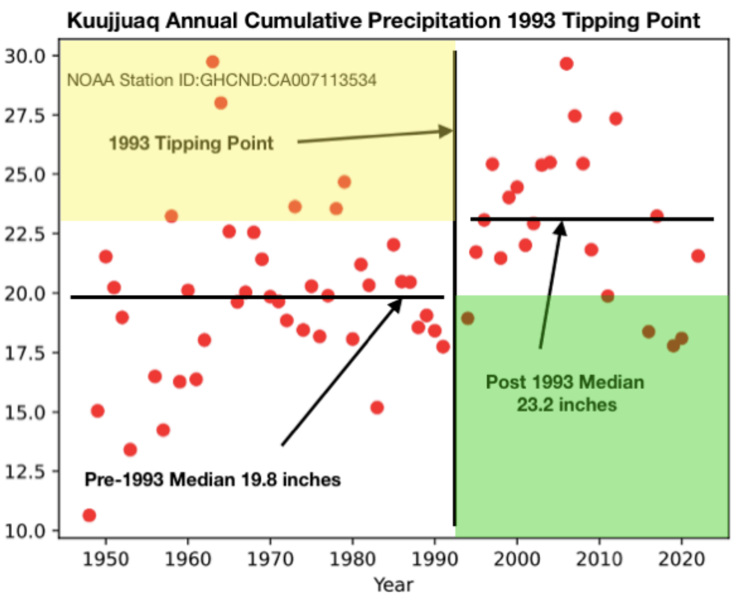
Thirteen years later in 1993, with the commissioning of the Brisay AMPS a second and more powerful tipping point presented itself.

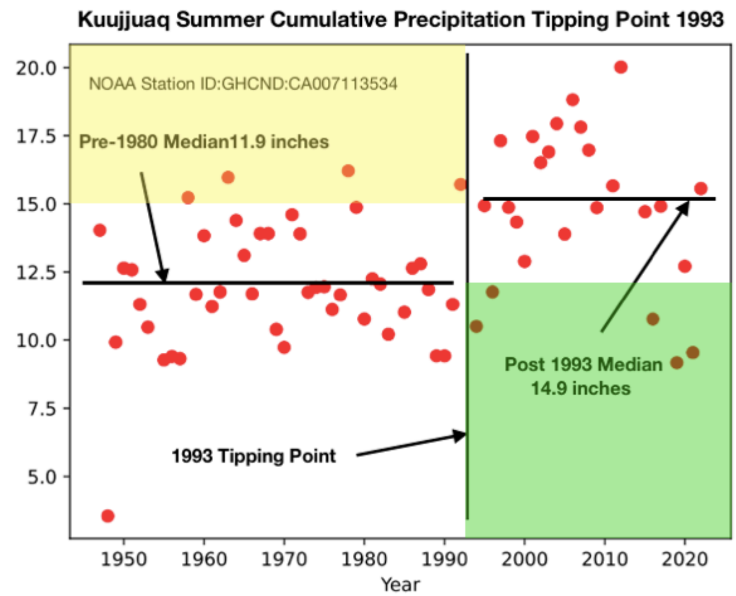
The 1991 to 2013 average annual temperature trend line for Kuujjuarapik exposes an ominous increase in temperature of 4.4 degrees Fahrenheit in 22 years. A similar warming rate was documented at Kuujjuaq. There was no data for 1992 and IPA's algorithm moved the hinge year back to 1991.

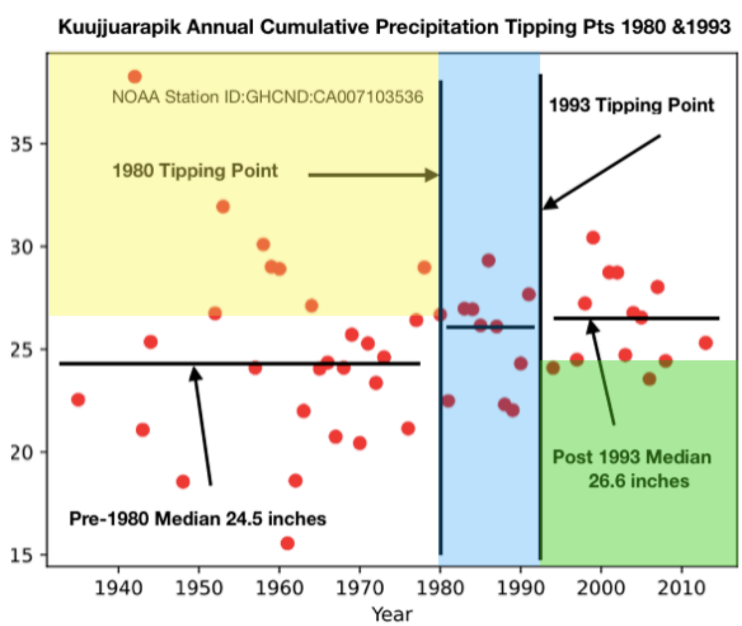


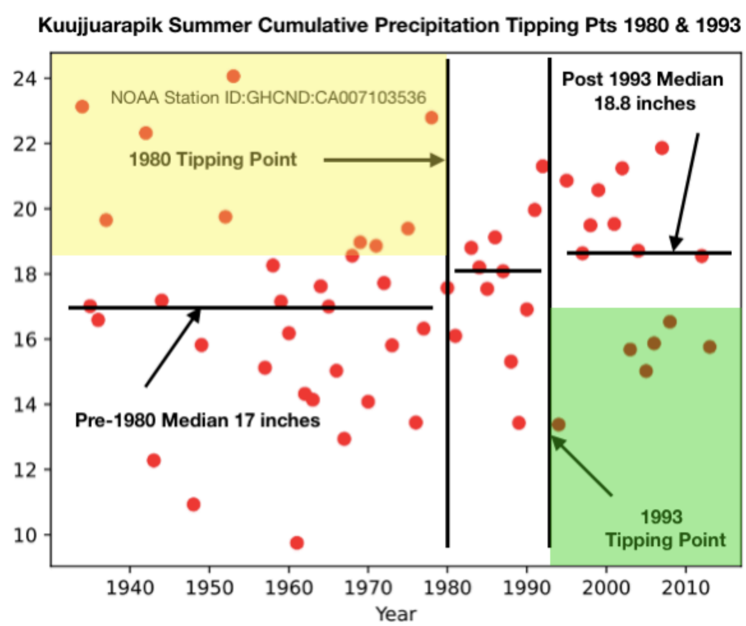


The 1993 Brisay tipping point was documented on the precipitation graphs at the Kuujjuaq and Kuujjuarapik weather stations.









Conclusion and Remediation Plan

To the best of my knowledge, there has never been an environmental study on the cumulative impacts of Quebec, Manitoba and Ontario AMPSs and HPPs on rivers flowing into James and Hudson Bays according to the following two articles.

1. **James Bay seen as test on environment** Star Phoenix, January 8, 1976, *"The man in charge of assessing the environmental impact of Quebec's massive James Bay hydroelectric project admitted Wednesday no one is sure just what its impact on the environment will be. 'We are using this project as an experience to see what will happen', Alain Soucy said in an interview. We have about $100 million to spend over the next 3 years on remedial action, though.' The head of James Bay Energy Corporation's environmental department said that even if there were severe environmental problems caused by the project it would not be curtailed. 'We can't change the scale of the project or it will not work.' He explained."*

2. **Slow Death in the North? Impact of Hudson Bay dams being ignored, critics charge** The Toronto Star (Toronto, Ontario), Canada) April 9, 1991, *" Are Hudson Bay and James Bay facing the slow death of a thousand cuts? Many environmentalist, native people and even a few government officials fear the answer is yes….. **Pollution and changes in the rivers flow could even alter North America's climate**….. The projects change the flow of freshwater into the bays. Normally, the rivers flow is highest in the spring. But the dams store the water until its released to spin the turbines later in the year. Cutting the spring flood can change the times and location of ice melting and also affects the bays' salinity. This alteration in a fragile, carefully balanced environment could have devastating effects on the whales, birds and other wildlife. But there's opposition from the hydrocorporation. " We're not against a global review," says Gaetan Guertin, director of impact assessment for Hydro-Quebec. "But if a decision on a 'go' or 'no go' will have to wait (for the results), there will be a reaction from Hydro-Quebec. Some of our projects are very tight in terms of scheduling."* (Emphasis added by SMK)

The graphs contained in this Primer provide compelling evidence that the summer and winter DOMEs of the James Bay experiment are the footprints of an environmental Frankenstein melting Greenland's glaciers. They also confirm that studies were warranted before and after AMPSs were built on Hudson Bay regional rivers.

It is my hypothesis that the immediate ending of the diversion of the Canaipiscau River, by restoring its natural flow northward to Ungava Bay, and the decommissioning and dismantling of the 1,700 square mile Caniapiscau Reservoir would create “negative feedbacks”. This should mitigate if not eliminate the many “positive feedbacks” created by this diversion and reservoir in the James Bay Hydroelectric Project on the La Grande River. This would end their climate warming power, significantly slow the fast paced warming of the Labrador Peninsula and Sea and melting of the Greenland’s ice sheets. It would also mitigate the global dangers of rapidly rising sea levels that are, as a result, taking and destroying public and private property by increased flooding and erosion events.

Footnote for temperature hinge graphs using software by Individual Prediction Analysis:

“Recorded average temperatures exhibit year to year as well as longer term variations. A trend curve averages out short term changes and retains hypothesized behavior. Traditionally straight lines, which best fit the data, were used as trends. Over the last 3/4 century temperatures have increased so dramatically that trend curves need more flexibility than linearity to adequately fit temperature data. We used a trend curve, which we call a hinge, that consist of two lines joined at a year (called the hinge year) that was determined by an extreme increase in the precipitation data. These tipping points coincide with the year an AMPS was commissioned upwind of the weather station.” Individual Prediction Analysis (IPA)

SMK/rdw **arcticbluedeserts.com** October 5, 2024