

MONTHLY REPORT OF HYDROLOGIC CONDITIONS

WFO Caribou, Maine

REPORT FOR:
MONTH YEAR

August 2023

TO: Hydrologic Information Center, W/OS31
NOAA's National Weather Service
1325 East West Highway
Silver Spring, MD 20910-3283

SIGNATURE

**James Sinko - Meteorologist
Hydrology Program Manager**

DATE

September 19, 2023

When no flooding occurs, include miscellaneous river conditions below the small box, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924).

An X inside this box indicates that no flooding occurred within this hydrologic service area.

August 2023

August 2023 was the second month in a row with a negative North Atlantic Oscillation (NAO) combined with a positive Pacific North American Pattern (PNA). This pattern within an El Nino regime resulted in August 2023 being remembered as a cooler than average temperature month with well above average precipitation. Looking at the reanalysis of August via the 500mb Geopotential Heights below it is no wonder we struggled in the month of August to even feel like summer. Long wave troughing that was generally over Ontario in July shifted its axis to over the State of Maine. This resulted in a significant lower 500mb heights anomaly bullseye over Maine with a greater than 30 meters anomaly negative in Maine.

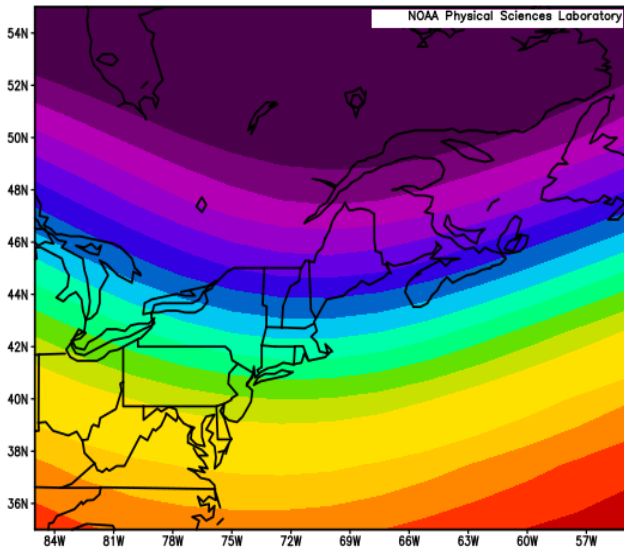


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo) August 2023

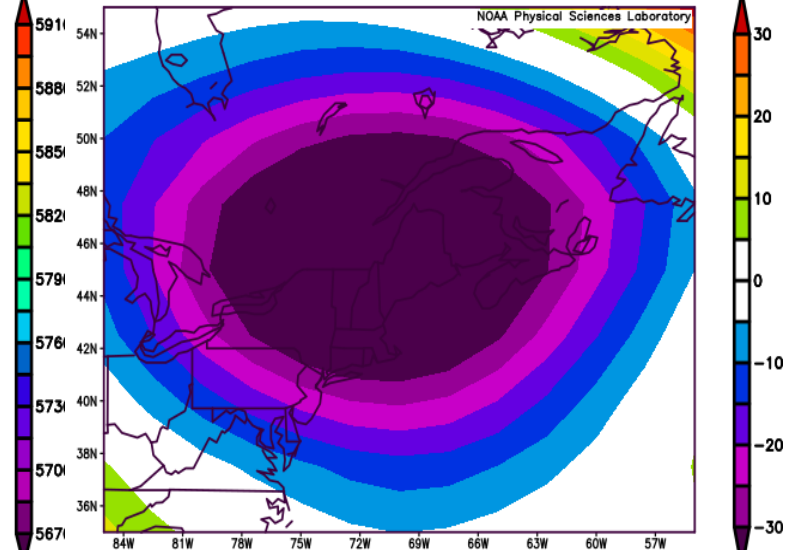


Figure 2: 500mb Geopotential Height (m) Composite Mean August 2023

Source: [NOAA Physical Sciences Laboratory](#)

Precipitation Totals for Select Locations with all units in inches

<i>Location</i>	<i>Total Precip</i>	<i>Normal Precip</i>	<i>Departure from Normal</i>	<i>% of Normal</i>	<i>Snowfall</i>	<i>Normal Snowfall</i>	<i>Departure from Normal</i>	<i>Greatest Snow Depth</i>	<i>Monthly Average Snow Depth</i>
Frenchville*	6.98	3.77	+3.21	185.1%					
Fort Kent	6.77	3.73	+3.04	181.5%	0.0	0.0	0	0	0
Van Buren	8.25	3.48	+4.77	237.1%	0.0	0.0	0	0	0
Caribou	6.60	3.61	+2.99	182.8%	0.0	0.0	0	0	0
Houlton	5.38	3.52	+1.86	152.8%					
Millinocket*	6.41	3.80	+2.61	168.7%	0.0			0	0
Greenville*	5.43	3.96	+1.47	137.1%					
Moosehead*	6.93	3.85	+3.08	180%					
Corinna	6.79	3.59	+3.20	189.1%					
Bangor	6.22	3.06	+3.16	203.3%	0.0	0.0	0.0	0	0
Grand Lake Stream	4.23	2.77	+1.46	152.7%	0.0	0.0	0.0	0	0
Robbinston*	7.68	3.45	+4.23	222.6%	0.0	0.0	0.0	0	0
Topsfield*	5.21	3.44	+1.77	151.5%	0.0	0.0	0.0	0	0

**Millinocket snowfall measured at CoOp site, not the ASOS site. Departure data is not available. *Moosehead Site is in GYX CWA*

**Topsfield Records date back to 2000, *Robbinston Records date back to 1994, *Greenville data gap between 1975 and 1999*

Rainfall rainfall across the region this August was well above average and ranged from 150 to 240 percent of normal, and was spread out fairly evenly across the month. In Caribou, it ranked as the 6th wettest August on record with 6.60 inches of rain. In Bangor, it ranked as the 5th wettest August on record with 6.22 inches of rain. Although not an official climate site due to the short period of record, Frenchville observed 6.98 inches of rain making it the wettest August since precipitation records began in 1998. In Fort Kent, where records do date back to 1893 but not an official climate site experienced its 12th wettest August on record. Moosehead, Maine site which is located along the West Outlet Branch of the Kennebec from Moosehead Lake on our county warning line border (site is in GYX CWA) measured its 8th wettest August on record, records date back to 1931. Lastly, Robbinston which has precipitation records only back to 1995 experienced its wettest August on record beating 2004 with the previous record. It is important to note that there is a small area of below normal precip for Northern Somerset County along the Quebec border, which was only 75-90% of normal for precipitation this month. The August 2023 total pan evaporation of 2.38 inches at Caribou was much less than rainfall across the region, meaning soils became increasingly moist. There were some fields at the end of the month that had patches of standing water. There was little severe weather in June and July, and August had the most reports of severe thunderstorms of any month this summer. On August 13th there were several severe thunderstorms that knocked down trees and produced large hail in portions of Aroostook, Piscataquis, and Penobscot counties.

Streamflows... Due to numerous rainfall events and cooler temperatures, Eastern & Northern Maine continued with the trend from July 2023 resulting in all our waterways Above Normal to Much Above Normal. The only exception is the below normal readings in the St. Croix upper basin likely due to dam operations.

Groundwater by the end of the month soil moisture values as depicted by the Climate Prediction Center were ranging between the 90th to 97th percentile, this is 1-3 inches above normal. By the end of the month groundwater monitoring sites reported Above Normal at Clayton Lake, Fort Kent and Calais. Much Above Normal in the rest of Central and Downeast Maine.

Temperatures... After the warmest July on record in Caribou and a top 4 warmest July on record at the other long term climate sites, August was much cooler across the region with temperatures that averaged from 1 to 2.5 degrees below average. In Caribou, there were no 80 degree days the entire month. The only other time this has occurred since weather records began in 1939 was back in 1972. On average, Caribou observes 8 days with a high of 80°F or warmer during the month of August. In Bangor, there were 7 days with a high of 80°F or warmer, and the highest temperature all month was 84°F. Typically Bangor observes 16 days during the month of August with a high of 80°F or warmer.

<i>Town/City</i>	<i>Avg Monthly Temperature (°F)</i>	<i>Normal Monthly Temperature (°F)</i>	<i>Departure from Normal (°F)</i>
Frenchville	62.1	64.6	-2.5
Fort Kent	60.7	62.9	-2.2
Van Buren	62.3	64.1	-1.8
Caribou	63.2	64.9	-1.7
Houlton	62.7	64.4	-1.7
Millinocket	65.3	66.5	-1.2
Greenville*	63.3	64.8	-1.5
Moosehead	62.4	63.3	-0.9
Corinna	65.5	67.7	-2.2
Bangor	67.0	68.2	-1.2
Grand Lake Stream	65.8	67.0	-1.2
Robbinston*	65.3	66.3	-1.0
Topsfield*	64.8	66.7	-1.9

**Topsfield Records date back to 2000, *Robbinston Records date back to 1994
*Greenville data gap between 1975 and 1999 *Moosehead Site is in GYX CWA on CWA border*

In regards to **Drought** monitoring there was no drought classification for the month of August.

Read below for specific details & maps of Streamflows, Groundwater Levels, Non-Routine Hydrologic Products issued by WFO Caribou and Drought conditions.

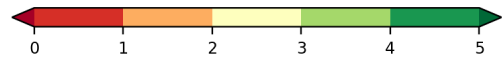
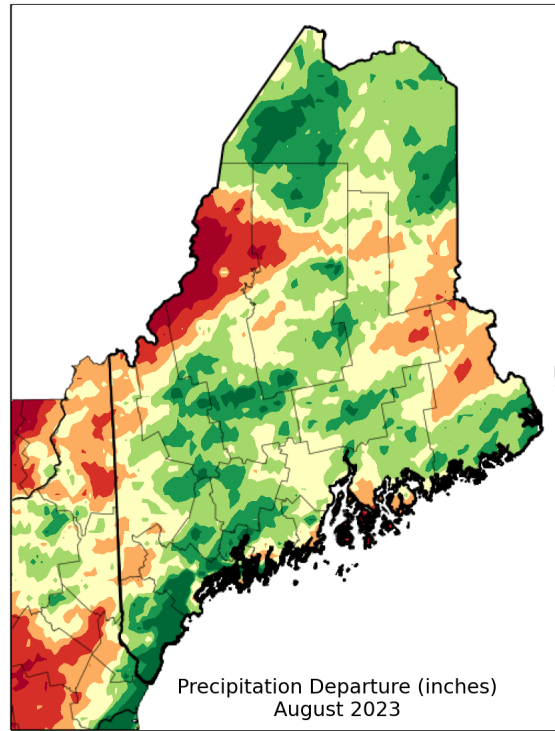
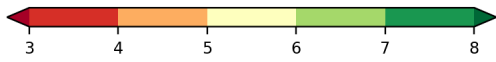
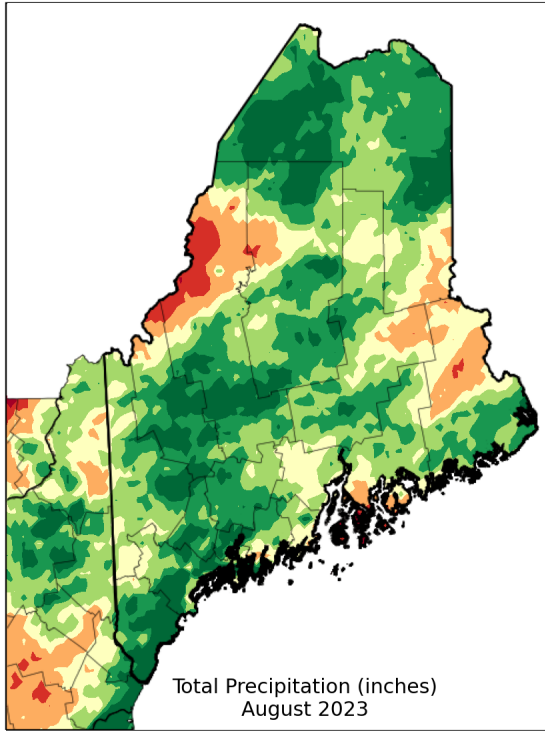


Figure 3: Monthly Precipitation Totals for August 2023

Figure 4: Monthly Precipitation Departures from Normal for August

Source: [Northeast Regional Climate Center](#)

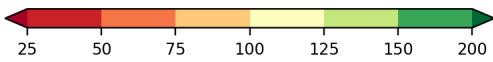
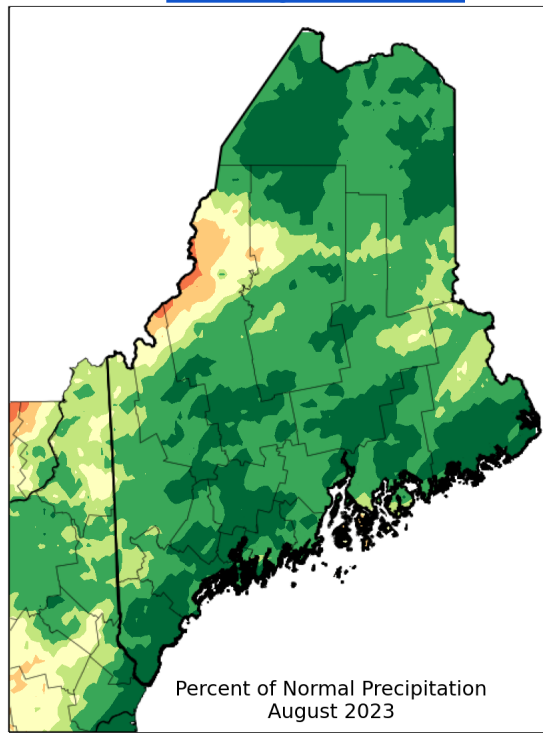


Figure 5: Percent of Normal Precipitation August 2023

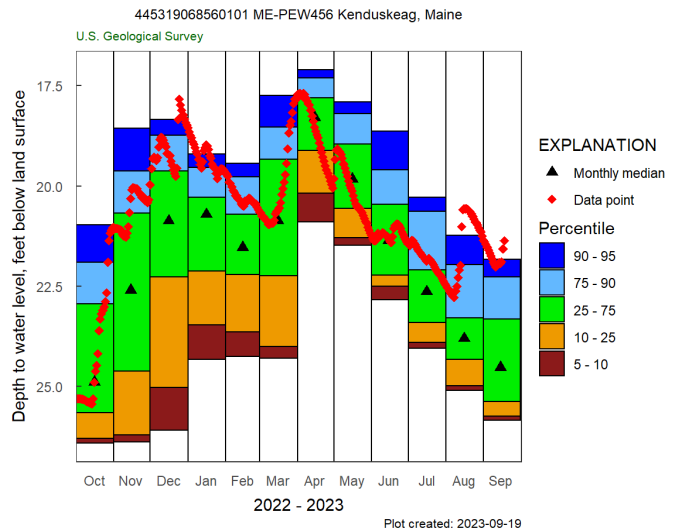
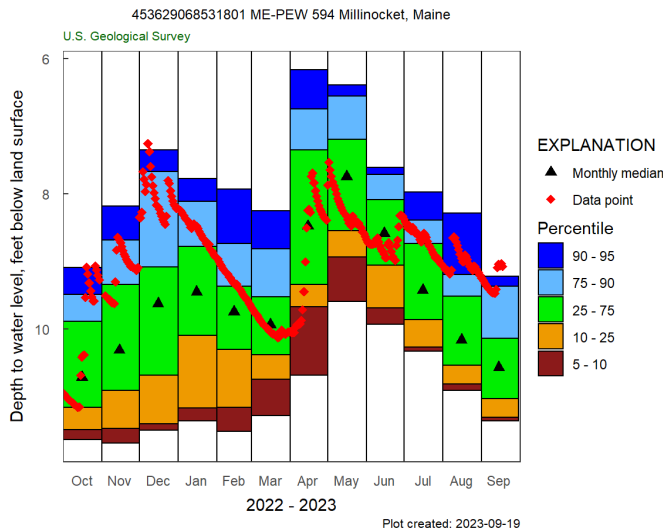
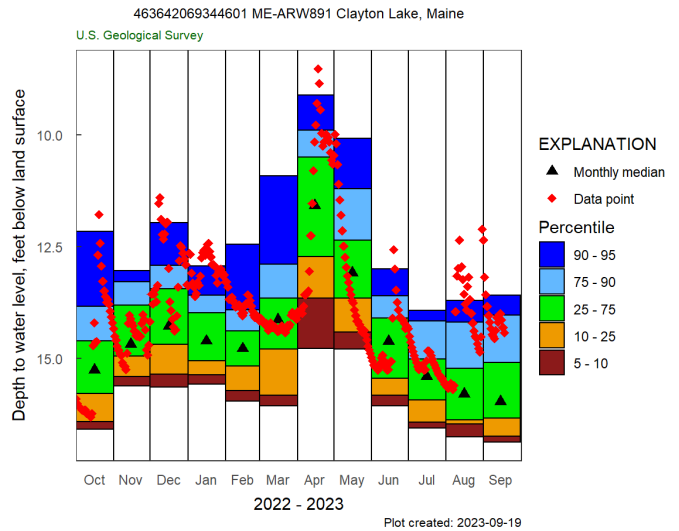
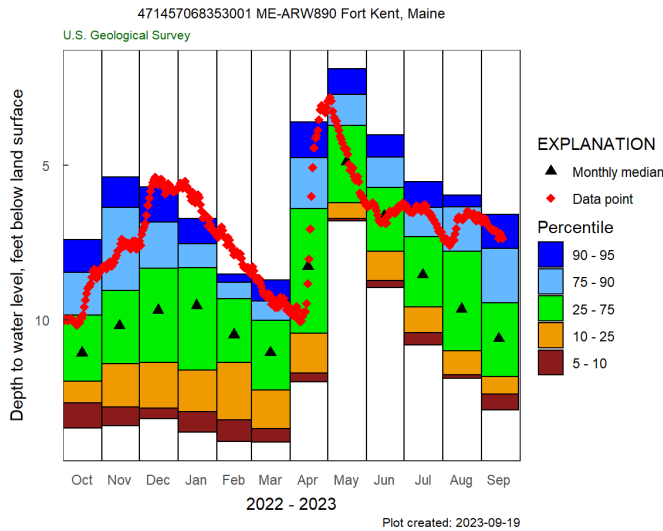
Source: [Northeast Regional Climate Center](#)

August Streamflows for Rivers

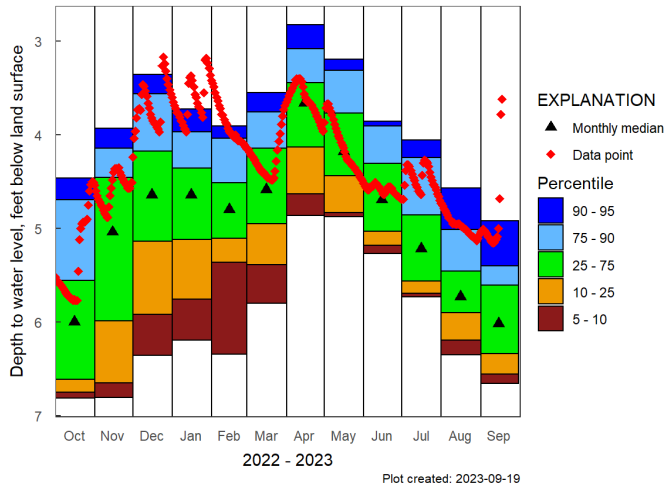
River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi ²)	Years of Record
Big Black River near Depot Mtn	604.46	423.80%	Much Above Normal	171	39
St. John River at Nine Mile Bridge	3635.03	279.82%	Much Above Normal	1341	72
Allagash River near Allagash	3136.42	276.93%	Much Above Normal	1478	93
St. John River at Dickey	7318.39	295.10%	Much Above Normal	2680	78
St. John River at Fort Kent	7170.13	138.06%	Above Normal	5929	96
Fish River near Fort Kent	768.88	106.27%	Normal	873	93
Aroostook River near Masardis	1541.97	247.82%	Above Normal	892	65
Aroostook River at Washburn	2854.29	267.40%	Much Above Normal	1654	92
St. Croix River at Vanceboro	436.75	56.70%	Much Below Normal	413	94
St. Croix River at Baring	1204.29	76.30%	Normal	1374	63
Grand Lake Stream at Grand Lake Stream	340.87	76.11%	Normal	228.3	94
Narraguagus River at Cherryfield	208.74	149.90%	Above Normal	227	75
East Branch Penobscot River at Grindstone	1769.68	189.62%	Above Normal	837	101
Mattawamkeag near Mattawamkeag	1660.97	212.57%	Above Normal	1418	88
Piscataquis River near Dover-Foxcroft	814.42	459.55%	Much Above Normal	298	120
Sebec River at Sebec	1009.68	371.44%	High	326	68
Piscataquis River at Medford	3330.32	417.88%	Much Above Normal	1162	92
Penobscot River at West Enfield	12889.35	198.06%	Much Above Normal	6422	120

August Average Groundwater Levels

Station	Percentile Class	Years of Record
Hadley Lakes	Much Above Normal	37
Kenduskeag	Much Above Normal	45
Calais	Above Normal	23
Millinocket	Much Above Normal	29
Clayton Lake	Above Normal	44
Fort Kent	Above Normal	45



445227067520101 ME-WW797 Township T24MD BPP (Hadley Lakes)
U.S. Geological Survey



450713067162801 ME-WW796 Calais, Maine
U.S. Geological Survey

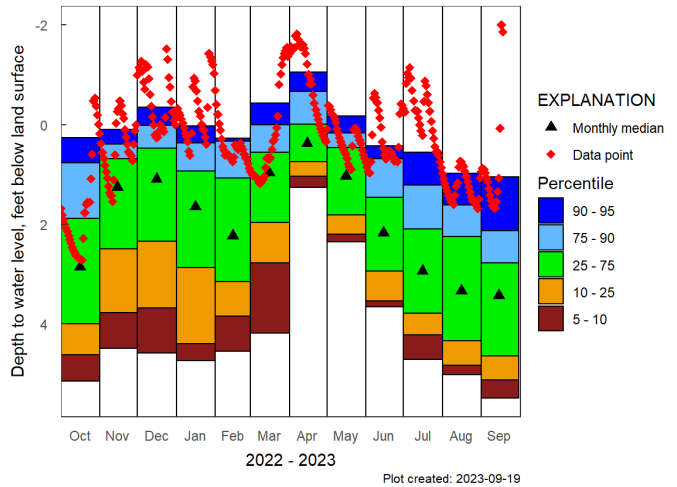


Figure 6-11: Groundwater Level Yearly Plots to Current
Source: [United States Geological Survey](https://www.usgs.gov/)

Flow or Water Level	Percentile Range	Explanation
Low	0 th	The monthly mean streamflow or median water level during this month is the lowest ever recorded during the period of record for this site.
Much below normal	0 th to 10 th	The monthly mean streamflow or median water level during this month is less than the 10 th percentile when compared to all of the months during the period of record for this site.
Below normal	10 th to 25 th	The monthly mean streamflow or median water level during this month is between the 10 th and 25 th percentiles when compared to all of the months during the period of record for this site.
Normal	25 th to 75 th	The monthly mean streamflow or median water level during this month is between the 25 th and 75 th percentiles when compared to all of the months during the period of record for this site.
Above normal	75 th to 90 th	The monthly mean streamflow or median water level during this month is between the 75 th and 90 th percentiles when compared to all of the months during the period of record for this site.
Much above normal	90 th to 100 th	The monthly mean streamflow or median water level during this month is greater than the 90 th percentile when compared to all of the months during the period of record for this site.
High	100 th	The monthly mean streamflow or median water level during this month is the highest ever recorded during the period of record for this site.

**Non-Routine Hydrologic Products
August 2023
WFO Caribou, ME**

Product	How Many Issued	Reason for Issuance
Flash Flood Warning	2	Excessive Rainfall due to Thunderstorms
Flood Advisory	7	Excessive Rainfall
Flood Watch	1	Excessive Rainfall