

MONTHLY REPORT OF HYDROLOGIC CONDITIONS

WFO Caribou, Maine

REPORT FOR:
MONTH YEAR

October 2023

SIGNATURE

**James Sinko - Meteorologist
Hydrology Program Manager**

DATE

November 7, 2023

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

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.

October 2023

October 2023 was the fourth month in a row with a negative North Atlantic Oscillation (NAO) which October NAO was the strongest since July at a monthly average of -2.03SD. This was combined with once again a positive Pacific North American Pattern (PNA) that was >1SD at 1.20SD monthly mean. This pattern resulted within a strong positive El Niño-Southern Oscillation (ENSO) eastern regime that saw increasing NINO 3.4 and 4 SST anomalies. This resulted in October 2023 being warmer than normal with above average precipitation across most of the region. Looking at the reanalysis of October via the 500mb Geopotential Heights below it was a significant westward shift from September 2023 resulting in weaker troughing overhead with warmer surges. This resulted in slightly higher 500mb heights anomalies over Northern Maine associated with the blocking North of the area from the negative NAO.

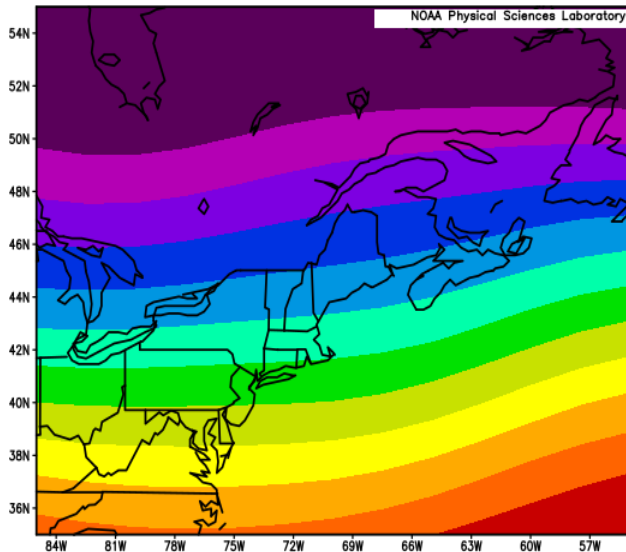


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo) October 2023

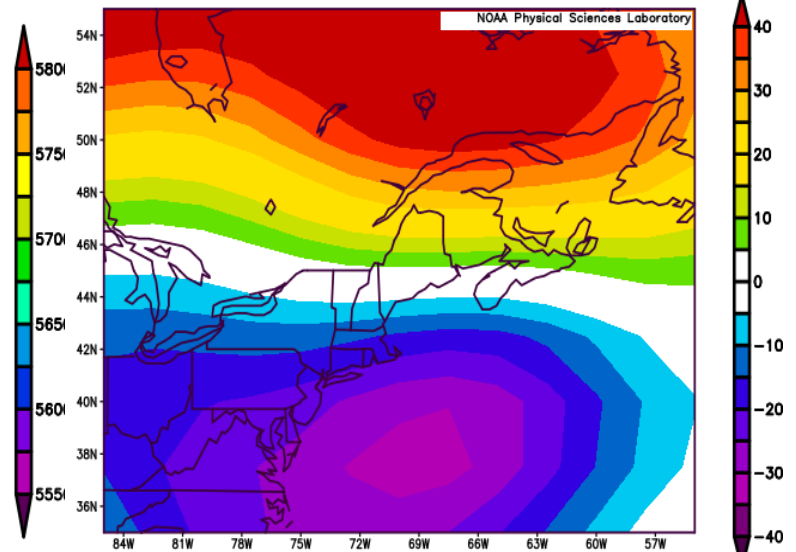


Figure 2: 500mb Geopotential Height (m) Composite Mean October 2023

Source: [NOAA Physical Sciences Laboratory](https://www.noaa.gov/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	3.70	3.46	+0.24	106.9%					
Fort Kent	5.40	4.26	+1.14	126.8%	2.0	1.1	+0.9	2	0.1
Van Buren	3.85	4.37	-0.52	88.1%	2.5	0.8	+1.7	3	0.1
Caribou	4.10	3.99	+0.11	102.8%	3.3	1.7	+1.6	3	0.1
Houlton	2.51	4.04	-1.53	62.1%					
Millinocket*	3.94	4.55	-0.61	86.6%	1.3			1	0.0
Greenville*	6.10	5.00	+1.10	122%					
Moosehead*	5.39	4.45	+0.94	121.1%					
Corinna	5.75	4.77	+0.98	120.5%					
Bangor	6.55	4.58	+1.97	143%	T	0.6	-0.6	0	0
Grand Lake Stream	6.88	5.05	+1.83	136.2%	T	0.1	-0.1	0	0
Robbinston*	5.33	5.43	-0.10	98.1%	T	0.3	-0.3	0	0
Topsfield*	5.34	5.39	-0.05	99%	3.8	1.0	+2.8	3	0.1

**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 for the month was variable across the region ranging from 110-150% of normal across the Downeast region and most of Northern Maine. There was a smaller area across Northern and Central Penobscot County and Southeast Aroostook County where precipitation ranged from 70-95% of normal. This is noted by the observations of Millinocket and Houlton above with Houlton being an isolated area at only 62% of normal. There was a significant rainfall event that occurred on October 7th that prompted a Flood Watch to be issued on Friday, October 6th for the potential of 1.5-4 inches of rain in the entire county warning area with isolated amounts to 5 inches. Widespread rainfall amounts of 2-4 inches were observed in Hancock, Piscataquis and Penobscot Counties. Widespread 1-2 inches were observed in Washington, Northern Somerset and Aroostook counties. There were reports of flooding of roads in Trenton, Southwest Harbor, East Surry and Somesville but mainly were minor issues. The highest rainfall in Aroostook County was 2.43 inches in Limestone, in Hancock County was 4.85 inches in Brooksville, in Washington County was 2.36 inches in Princeton, in Penobscot County was 4.46 inches in Dixmont, in Piscataquis County was 4.20 inches in Shirley and lastly Northern Somerset 1.58 inches at the St. Zacharie Border Crossing.

Snowfall... Yes, we did see snowfall right before the end of the month. First snowfall of the season was observed on the 30th with amounts mostly ranging from 2 to 4 inches from Northern Washington County and Southern Piscataquis County north to the St. John Valley. The 3.3 inches of snow that was observed in Caribou on the 30th broke the previous daily record of 2.3 inches set in 1941. October 2023 was the 17th snowiest October on record with records dating back to 1940.

Streamflows... We are continuing to slowly see streamflows drop from what has been a very wet summer and early fall. The period of June 1st-September 30th was the 11th wettest on record in Caribou and 10th wettest in Bangor. Given the soaked grounds many rainfall events resulted in significant runoff into the rivers and streams and due to consecutive events it kept the rivers elevated for much of the region. “Above Normal” to “Much Above Normal” conditions were observed for the month on the Aroostook, Piscataquis, Penobscot, Mattawamkeag and Narraguagus basins. “Normal” streamflows were observed on the St. John and Fish River basins with an “Above Normal” average on the Allagash River basin. “Normal” conditions were noted on Grand Lake Stream and the low portions of the St. Croix River. The upper extents of the St. Croix were reported “Below Normal” but it is important to note that the St. Croix is highly regulated by dams for the production of power and mill usage.

Groundwater was “Much Above Normal” across much of the state with “Below Normal” readings in the North Woods given the less rainfall in the North Woods over the last couple months. Across the North Woods with a relatively drier October we saw readings fall from >99th percentile to 73rd percentile.

Temperatures... averaged from 6-7 degrees above the 1991-2020 normals. In Caribou, it was the 2nd warmest October on record behind only 2017. Bangor and Millinocket observed their 2nd warmest Octobers on record behind 2017. In Houlton, it tied for the warmest October on record with 2017. The first sub-freezing temperature of the month was observed at Caribou on the 24th which was the 2nd latest on record behind October 30, 2020. In Houlton the first sub-freezing temperature was observed on the 23rd, which was the latest on record. The previous record for Houlton was October 21, 1957. In Bangor, the first sub-freezing temperature was observed on the 31st, which was the 4th latest on record.

<i>Town/City</i>	<i>Avg Monthly Temperature (°F)</i>	<i>Normal Monthly Temperature (°F)</i>	<i>Departure from Normal (°F)</i>
Frenchville	49.9	43.8	+6.1
Fort Kent	49.4	41.8	+7.6
Van Buren	50.7	42.9	+7.8
Caribou	51.1	44.5	+6.6
Houlton	51.3	44.3	+7.0
Millinocket	52.6	46.0	+6.6
Greenville*	52.0	44.9	+7.1
Moosehead	50.2	43.8	+6.4
Corinna	53.3	47.9	+5.4
Bangor	54.6	48.2	+6.4
Grand Lake Stream	53.2	47.4	+5.8
Robbinston*	53.3	48.0	+5.3
Topsfield*	52.6	46.4	+6.2

**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 October.

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

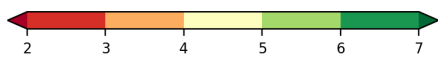
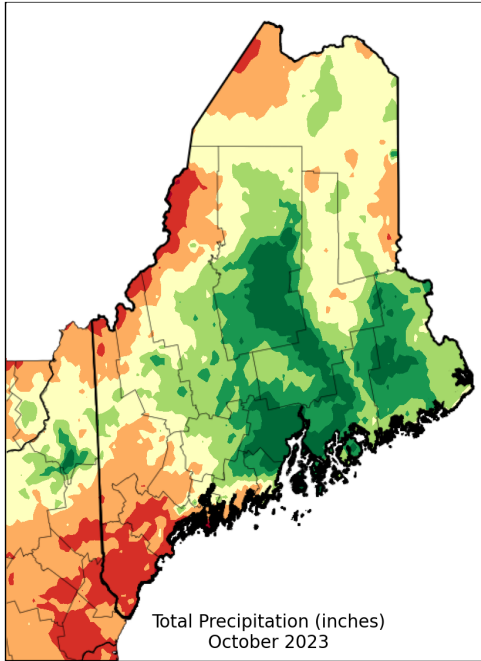


Figure 3: Total Liquid Precipitation for October

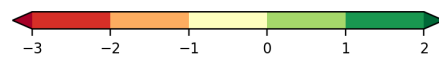
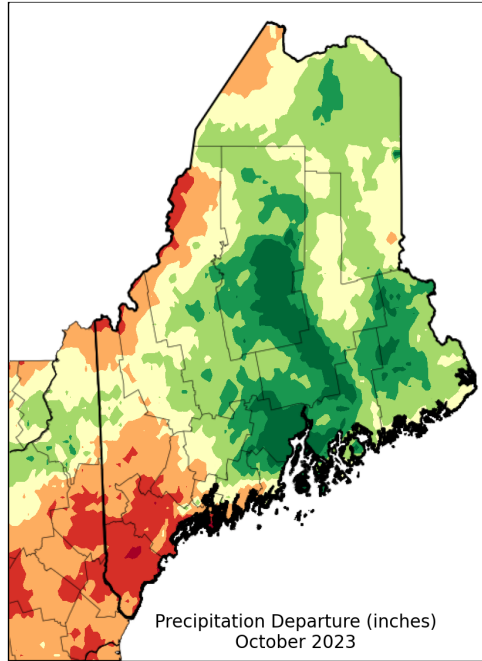


Figure 4: Liquid Precipitation Departure for October
Source: [Northeast Regional Climate Center](#)

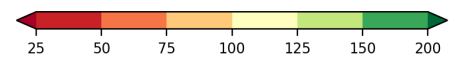
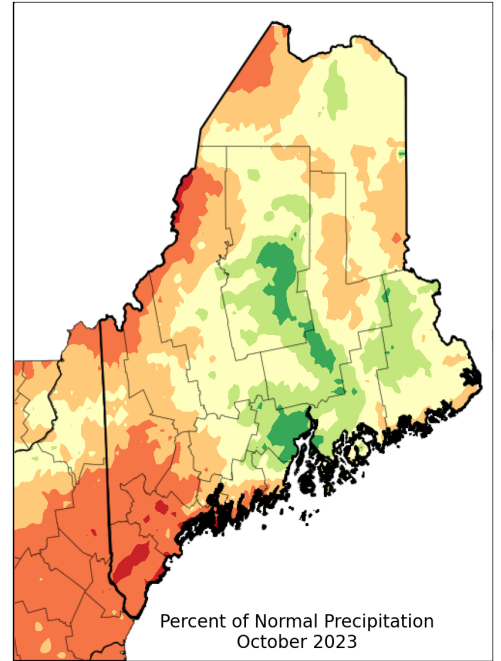


Figure 5: Percent of Normal Precipitation for October

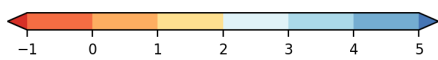
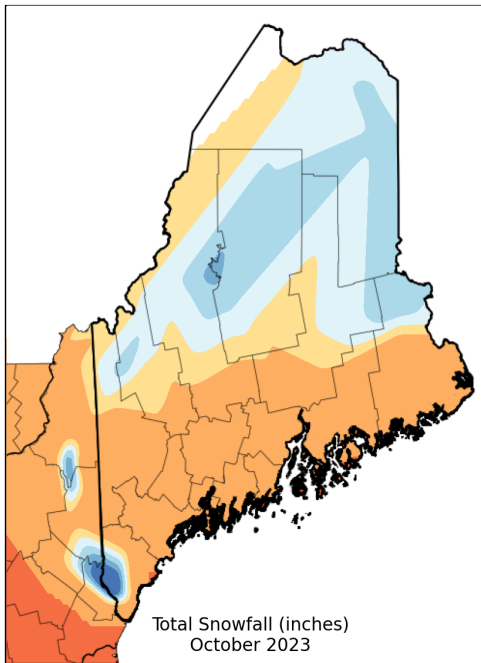


Figure 6: Total Snowfall for October

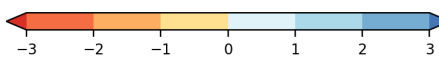
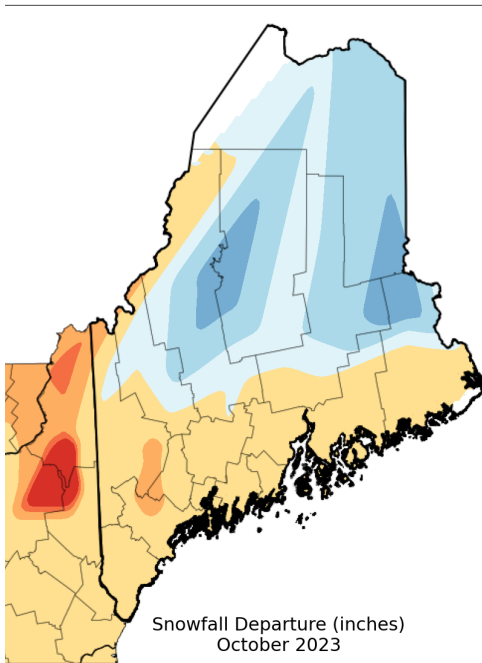


Figure 7: Total Snowfall Departure for October
Source: [Northeast Regional Climate Center](#)

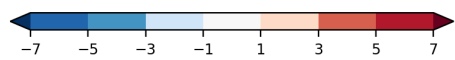
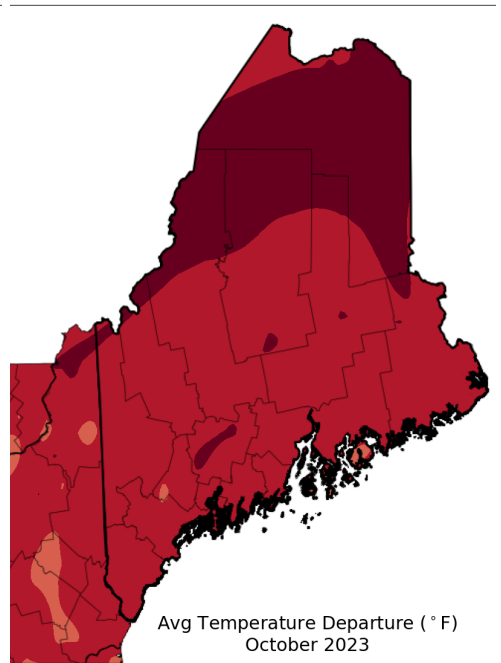


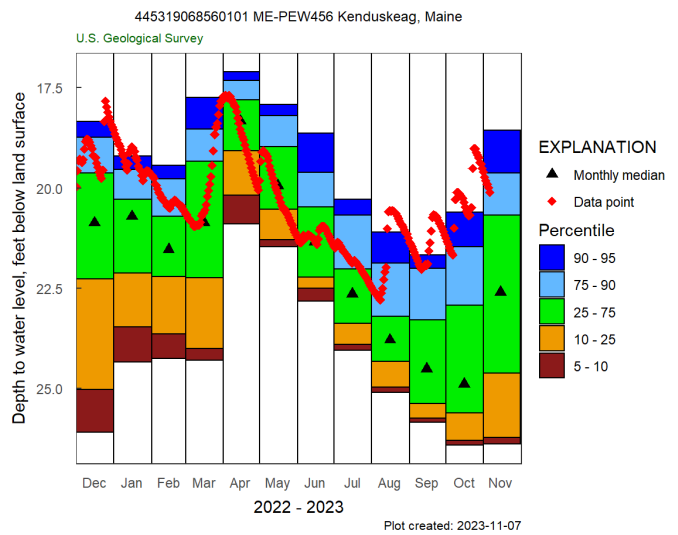
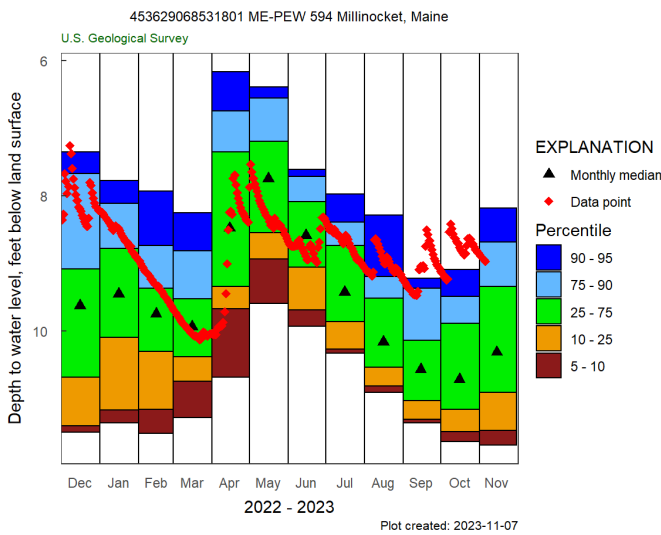
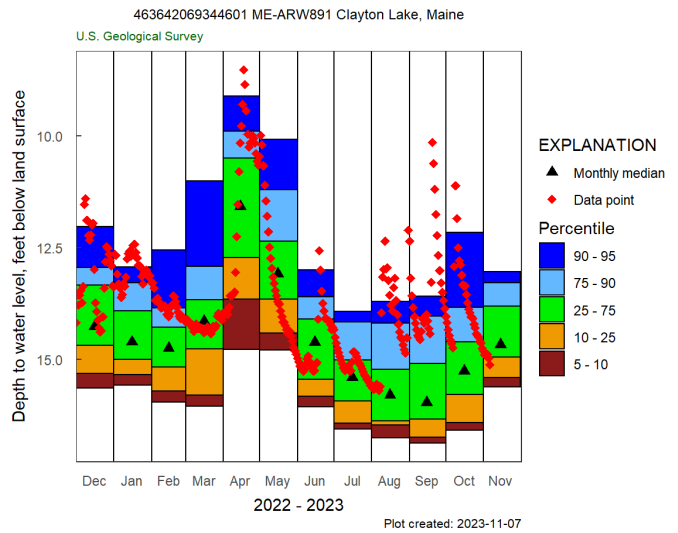
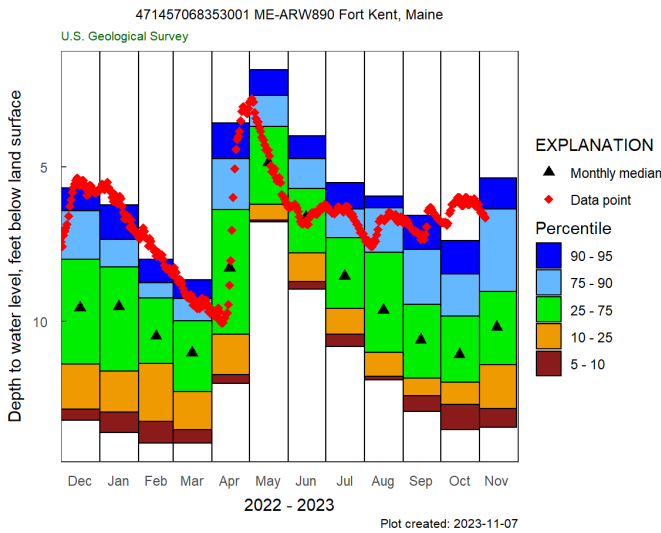
Figure 8: Average Temperature Departure for October

October Streamflows for Rivers

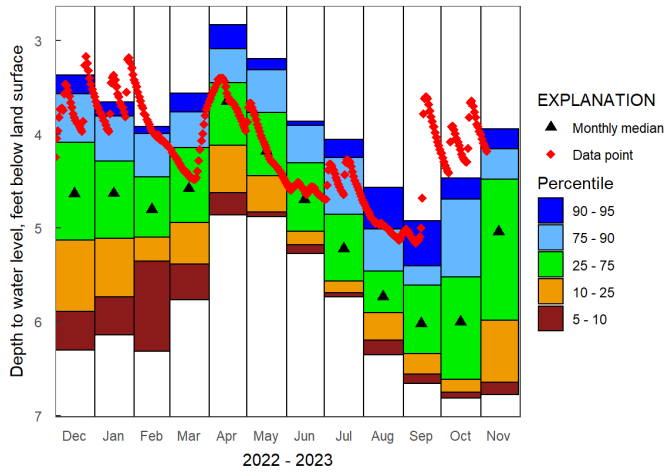
River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi ²)	Years of Record
Big Black River near Depot Mtn	369.05	126.87%	Normal	171	40
St. John River at Nine Mile Bridge	2746.42	128.64%	Normal	1341	73
Allagash River near Allagash	2197.10	163.92%	Above Normal	1478	94
St. John River at Dickey	4796.77	127.25%	Normal	2680	79
St. John River at Fort Kent	5028.87	72.67%	Normal	5929	97
Fish River near Fort Kent	897.46	109.98%	Normal	873	94
Aroostook River near Masardis	1545.39	136.93%	Above Normal	892	66
Aroostook River at Washburn	2932.58	154.20%	Above Normal	1654	93
St. Croix River at Vanceboro	368.19	61.51%	Below Normal	413	94
St. Croix River at Baring	1651.44	83.78%	Normal	1374	64
Grand Lake Stream at Grand Lake Stream	312.54	90.92%	Normal	228.3	94
Narraguagus River at Cherryfield	715.42	234.84%	Much Above Normal	227	74
East Branch Penobscot River at Grindstone	2822.58	203.40%	Above Normal	837	102
Mattawamkeag near Mattawamkeag	2822	177.34%	Above Normal	1418	89
Piscataquis River near Dover-Foxcroft	1022.45	231.61%	Above Normal	298	121
Sebec River at Sebec	1203.61	295.69%	Much Above Normal	326	67
Piscataquis River at Medford	4019.06	222.76%	Above Normal	1162	92
Penobscot River at West Enfield	17451.61	193.39%	Much Above Normal	6422	121

October Average Groundwater Levels

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

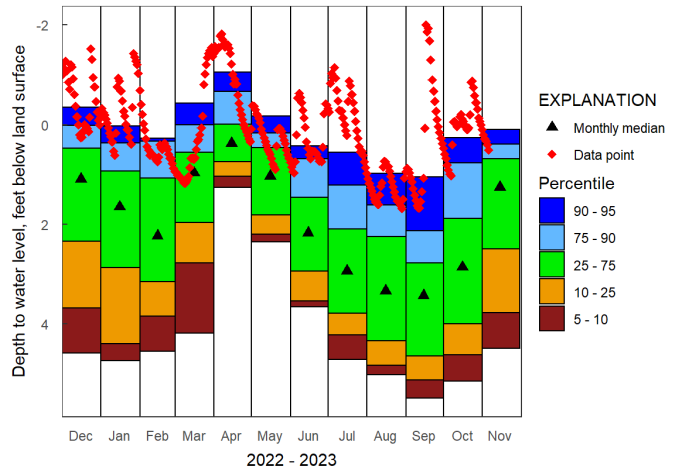


445227067520101 ME-WW797 Township T24MD BPP (Hadley Lakes)
U.S. Geological Survey



Plot created: 2023-11-07

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



Plot created: 2023-11-07

Figure 9-14: Groundwater Level Yearly Plots to Current
Source: [United States Geological Survey](https://www.usgs.gov/)

Flow or Water Level	Percentile Range	Explanation
Ice Impacted	NA	Ice impacted resulting in No Data available
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 from WFO Caribou, ME October 2023

Product	How Many Issued	Reason for Issuance
Flood Advisory	2	Excessive Rainfall
Flood Watch	1	Excessive Rainfall