

MONTHLY REPORT OF HYDROLOGIC CONDITIONS

WFO Caribou, Maine

REPORT FOR:
MONTH YEAR

September 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

October 5, 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.

September 2023

September 2023 was the third month in a row with a negative North Atlantic Oscillation (NAO) combined with a positive Pacific North American Pattern (PNA). This pattern within a strong positive El Niño-Southern Oscillation (ENSO) eastern regime resulted in September 2023 being remembered as a much warmer than normal month with above average precipitation across most of the region. Looking at the reanalysis of September via the 500mb Geopotential Heights below it was a significant change from August 2023 resulting in nearly zonal flow overhead with warm surges as the main troughing was located over the Ohio River Valley. This resulted in slightly higher 500mb heights anomalies over Maine associated with the blocking North of the area from the negative NAO.

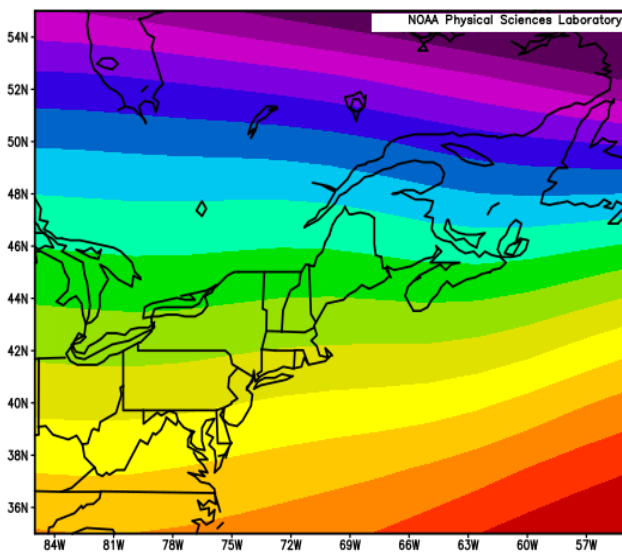


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo) September 2023

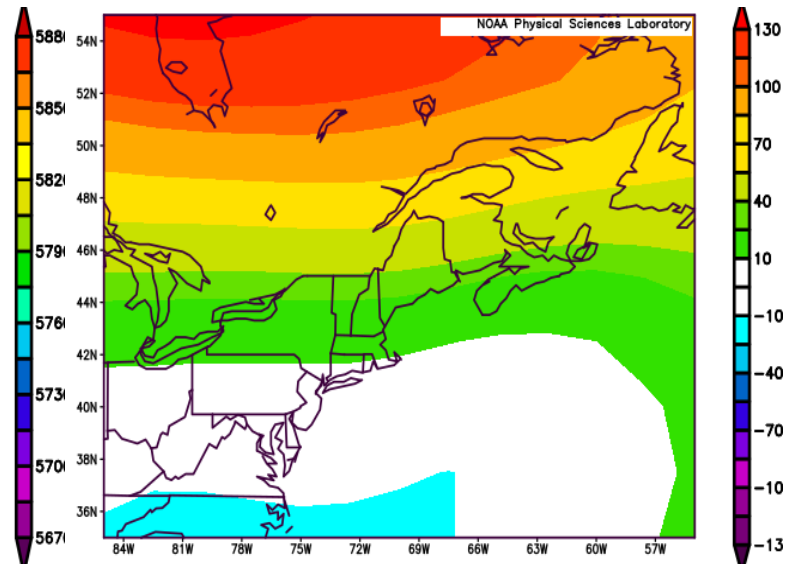


Figure 2: 500mb Geopotential Height (m) Composite Mean September 2023

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 | 4.53 | 3.46 | +1.07 | 130.9% | | | | | |
| Fort Kent | 4.46 | 3.72 | +0.74 | 119.9% | 0.0 | 0.0 | 0 | 0 | 0 |
| Van Buren | 3.28 | 3.83 | -0.55 | 85.6% | 0.0 | 0.0 | 0 | 0 | 0 |
| Caribou | 4.00 | 3.44 | +0.56 | 116.3% | 0.0 | 0.0 | 0 | 0 | 0 |
| Houlton | 5.53 | 3.40 | +2.13 | 162.6% | | | | | |
| Millinocket* | 5.84 | 3.61 | +2.23 | 161.7% | 0.0 | | | 0 | 0 |
| Greenville* | 4.48 | 3.44 | +1.04 | 130.2% | | | | | |
| Moosehead* | 3.83 | 3.42 | +0.41 | 112% | | | | | |
| Corinna | 3.43 | 3.56 | -0.13 | 96.3% | | | | | |
| Bangor | 3.54 | 3.76 | -0.22 | 94.1% | 0.0 | 0.0 | 0.0 | 0 | 0 |
| Grand Lake Stream | 8.07 | 3.54 | +4.53 | 228% | 0.0 | 0.0 | 0.0 | 0 | 0 |
| Robbinston* | 6.08 | 4.23 | +1.85 | 143.7% | 0.0 | 0.0 | 0.0 | 0 | 0 |
| Topsfield* | 6.11 | 4.01 | +2.10 | 152.4% | 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 for the month began and ended with dry weather, but it was wet much of the time from the 7th through the 19th. The most significant weather event of the month was the rain and wind associated with post-tropical cyclone Lee which made landfall in Nova Scotia then crossed the Bay of Fundy into New Brunswick. Rainfall amounts were the highest along the coast with reports of 4.4 inches of rain near Southwest Harbor and as much as 6.25 inches near Whiting in Washington County. There were several reports of 4-6 inches of rain across Coastal Washington county. For the month as a whole a large portion of the Central Highlands, Southern Aroostook and Interior Downeast was 130-200% of normal for precipitation. The Greater Bangor area to the eastern side of Penobscot Bay ranged from 90 to 110% of normal. Across the Moosehead Region to North Woods and the St. John Valley ranged from 110-130% of normal with a low spot around Van Buren at 85%. Post-Tropical Cyclone Lee resulted in several reports of flash flooding and flooding in Washington County thanks to a slow moving western banded feature that struggled to move on September 16th. We had a few scattered poor drainage flooding reports in Hancock, Penobscot and Aroostook counties from the heavy rainfall. Grand Lake Stream Cooperative Observer reported a monthly total of 8.07 inches which is the 3rd highest total precipitation in the month of September for this site which records date back to 1962. Houlton saw the 10th wettest September on record at 5.53 inches, records dating back to 1948.

Streamflows... Due to numerous rainfall events across Maine during the middle of the month and the rainfall of August the streams remained significantly elevated compared to climatological normals. The main stem rivers besides Piscataquis & Mattawamkeag experienced just gradual rises and falls given their capabilities to hold more water than shallow based rivers like the Piscataquis and Mattawamkeag. The Piscataquis and Mattawamkeag experienced significant rises after Lee when there was widespread 1-3 inches across the basins. The upper Piscataquis and the Mattawamkeag saw increased flows on September 19-20th but remained below flood stage after additional rainfall on top of Lee rainfall.

Groundwater remained Much Above Normal for the month to near record levels given the continued rainfall above normal in most areas. Groundwater levels were mainly >90th percentile with soil moisture in the “root zone” being in the 95-99th percentile.

Temperatures... Caribou was the 4th warmest September on record, Millinocket was the 3rd warmest and Houlton the 5th warmest. In Bangor it tied with 1933 at the 6th warmest September on record. Temperatures generally ranged from 3.5 to 4.5 degrees above the 1991-2020 normals.

| <i>Town/City</i> | <i>Avg Monthly Temperature (°F)</i> | <i>Normal Monthly Temperature (°F)</i> | <i>Departure from Normal (°F)</i> |
|--------------------------|-------------------------------------|--|-----------------------------------|
| Frenchville | 59.8 | 56.1 | +3.7 |
| Fort Kent | 59.1 | 54.3 | +4.8 |
| Van Buren | 59.3 | 55.4 | +3.9 |
| Caribou | 60.9 | 56.6 | +4.3 |
| Houlton | 59.7 | 56.2 | +3.5 |
| Millinocket | 62.5 | 58.2 | +4.3 |
| Greenville* | 62.3 | 57.2 | +5.1 |
| Moosehead | 59.1 | 56.0 | +3.1 |
| Corinna | 63.1 | 59.8 | +3.3 |
| Bangor | 64.0 | 59.9 | +4.1 |
| Grand Lake Stream | 62.7 | 59.4 | +3.3 |
| Robbinston* | 62.3 | 59.0 | +3.3 |
| Topsfield* | 62.0 | 58.3 | +3.7 |

**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 September.

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

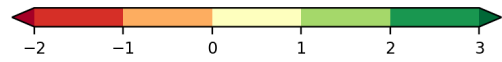
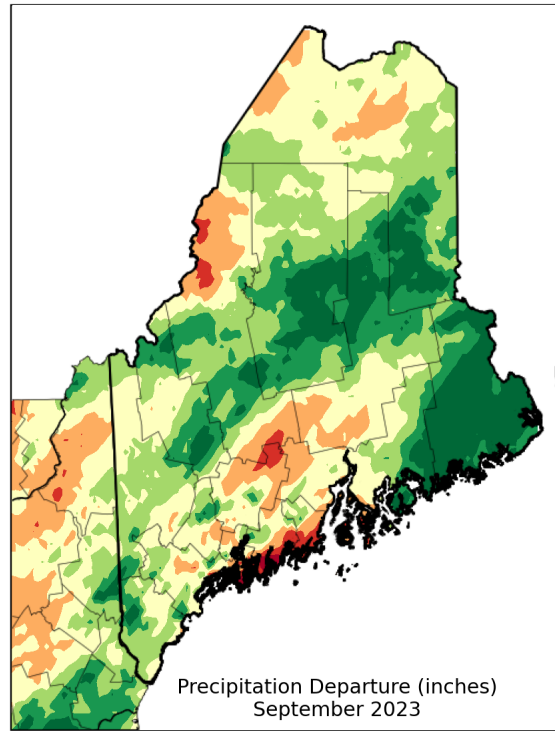
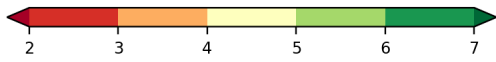
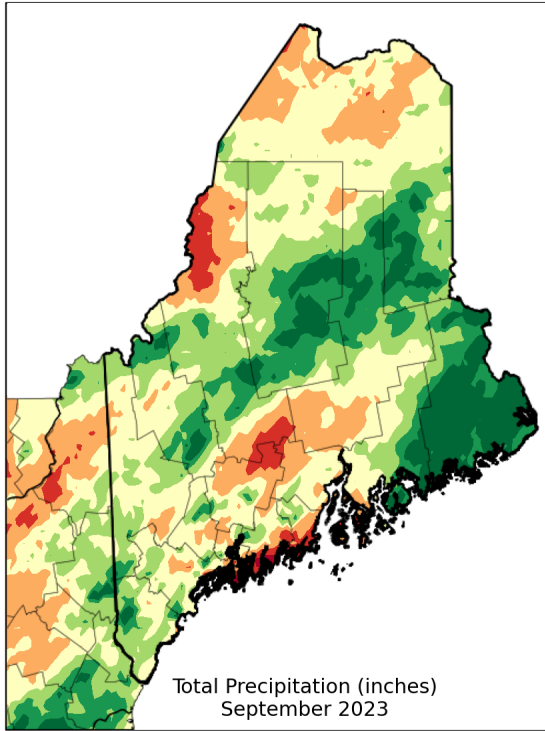


Figure 3: Monthly Precipitation Totals for September 2023

Figure 4: Monthly Precipitation Departures from Normal for September

Source: [Northeast Regional Climate Center](#)

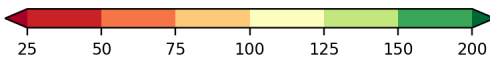
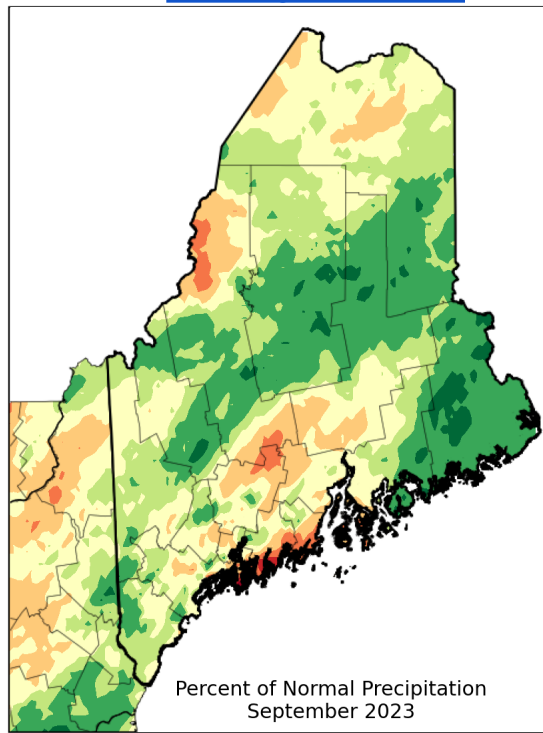


Figure 5: Percent of Normal Precipitation September 2023

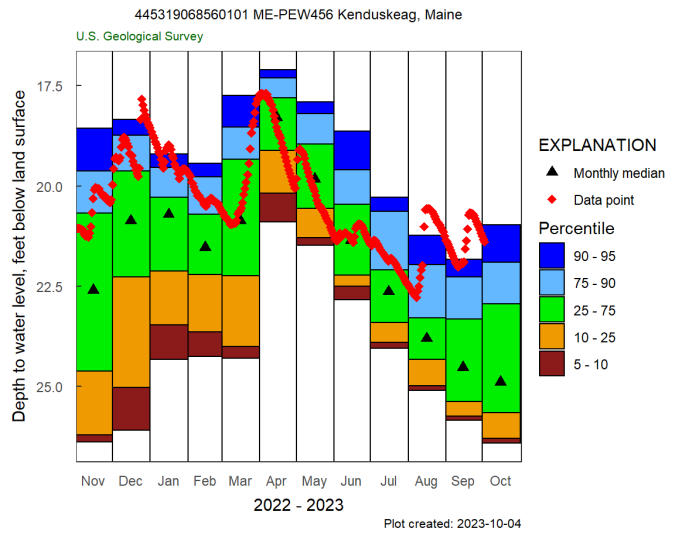
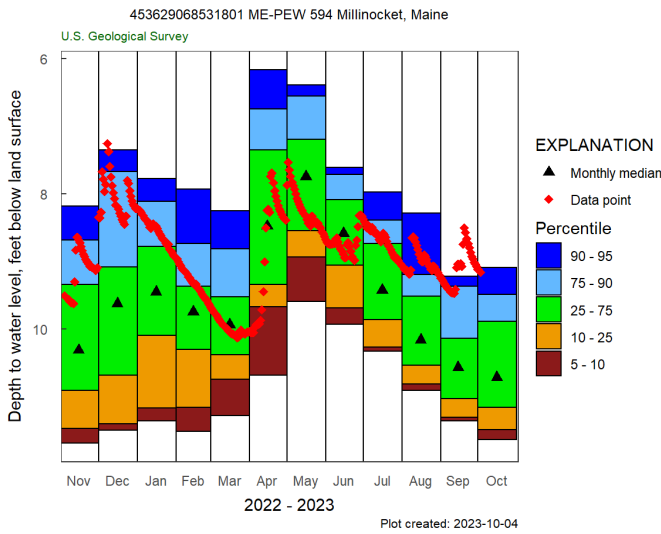
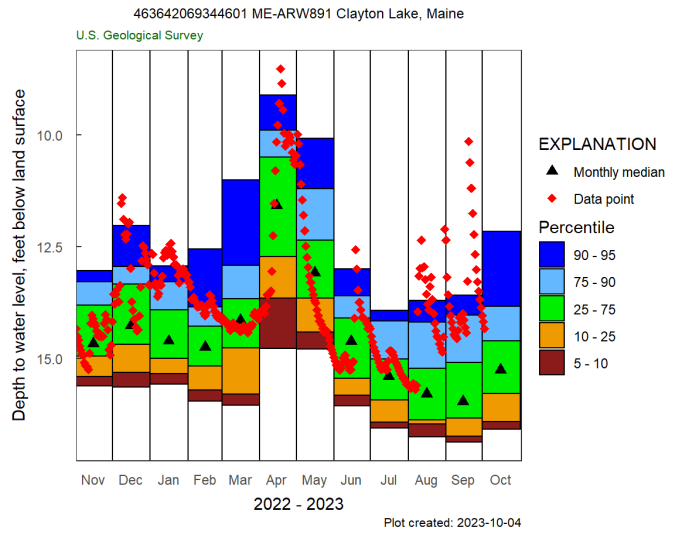
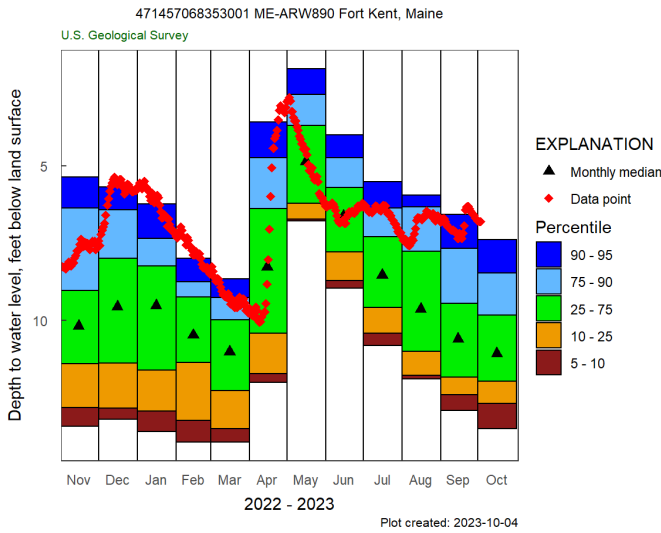
Source: [Northeast Regional Climate Center](#)

September Streamflows for Rivers

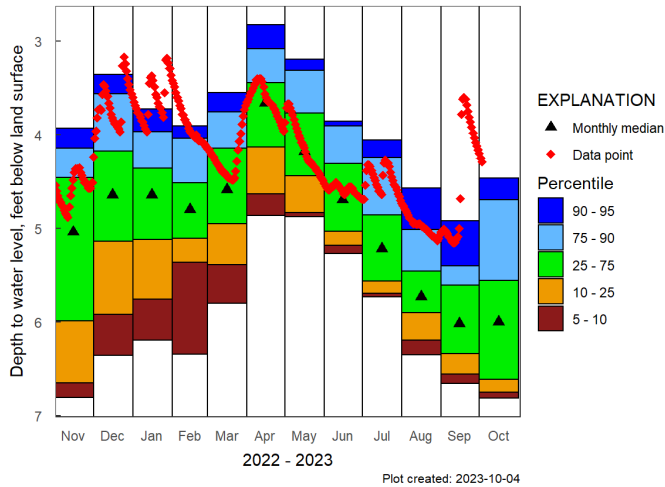
| River | Monthly Mean Flow (cfs) | % Normal (mean) | Percentile Class | Drainage (mi ²) | Years of Record |
|---|-------------------------|-----------------|-------------------|-----------------------------|-----------------|
| Big Black River near Depot Mtn | 522.07 | 421.09% | Much Above Normal | 171 | 39 |
| St. John River at Nine Mile Bridge | 4790 | 388.93% | High | 1341 | 72 |
| Allagash River near Allagash | 3216.67 | 312.79% | Much Above Normal | 1478 | 93 |
| St. John River at Dickey | 7947 | 351.38% | Much Above Normal | 2680 | 78 |
| St. John River at Fort Kent | 7148.83 | 156.53% | Above Normal | 5929 | 96 |
| Fish River near Fort Kent | 879.74 | 152.55% | Above Normal | 873 | 93 |
| Aroostook River near Masardis | 1970.10 | 297.88% | Much Above Normal | 892 | 65 |
| Aroostook River at Washburn | 3808.33 | 338.42% | Much Above Normal | 1654 | 92 |
| St. Croix River at Vanceboro | 560.11 | 78.92% | Normal | 413 | 94 |
| St. Croix River at Baring | 2200.78 | 132.52% | Above Normal | 1374 | 63 |
| Grand Lake Stream at Grand Lake Stream | 170.12 | 38.48% | Much below normal | 228.3 | 94 |
| Narraguagus River at Cherryfield | 710.27 | 423.28% | Much Above Normal | 227 | 75 |
| East Branch Penobscot River at Grindstone | 2592 | 267.81% | Much Above Normal | 837 | 101 |
| Mattawamkeag near Mattawamkeag | 3512.67 | 422.26% | Much Above Normal | 1418 | 88 |
| Piscataquis River near Dover-Foxcroft | 914.53 | 493.94% | Much Above Normal | 298 | 120 |
| Sebec River at Sebec | 991.60 | 275.47% | Much Above Normal | 326 | 68 |
| Piscataquis River at Medford | 3575.87 | 388.06% | Much Above Normal | 1162 | 92 |
| Penobscot River at West Enfield | 16746.67 | 249.79% | Much Above Normal | 6422 | 120 |

September Average Groundwater Levels

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



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



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

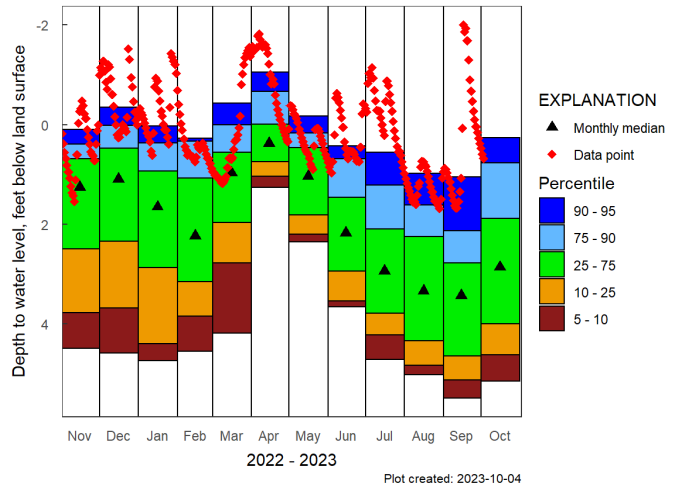


Figure 6-11: Groundwater Level Yearly Plots to Current
Source: [United States Geological Survey](https://www.usgs.gov/)

| 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
September 2023
WFO Caribou, ME**

| Product | How Many Issued | Reason for Issuance |
|---------------------|-----------------|---------------------|
| Flash Flood Warning | 3 | Excessive Rainfall |
| Flood Advisory | 13 | Excessive Rainfall |
| Flood Watch | 2 | Excessive Rainfall |

Flooding Pictures

These are photos of flooding along the Stacyville Road in T1R8 Wels located in Penobscot County (~45.72N, -68.72W). Courtesy Lori & Paul Willey.

