

**MONTHLY REPORT OF HYDROLOGIC CONDITIONS**

**WFO Caribou, Maine**

REPORT FOR:  
MONTH YEAR

**May 2023**

SIGNATURE

**James Sinko - Meteorologist  
Hydrology Program Manager**

DATE

**June 13, 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.

**May 2023**

May 2023 for the region finished with near to slightly below average temperatures and slightly below average for total precipitation compared to the 1991-2020 climate normals. This was a result of the monthly average of the North Atlantic Oscillation (NAO) pattern of +0.39 standard deviation, while the Pacific North American (PNA) pattern at -0.86 standard deviation. This pattern resulted within a rapidly intensifying El Nino ENSO pattern and what was a weak Maritime Continent Madden-Julian phase that shifted to the Western Pacific. This typically results in weak lower 500mb heights over Maine given the weaker positive NAO & strong negative PNA. This is depicted below in the reanalysis of the monthly anomaly of the 500mb Geopotential Heights and the mean heights. We saw anomalous low heights for the month over the Canadian Maritimes. This pattern typically favors around average temperatures & below normal precipitation.

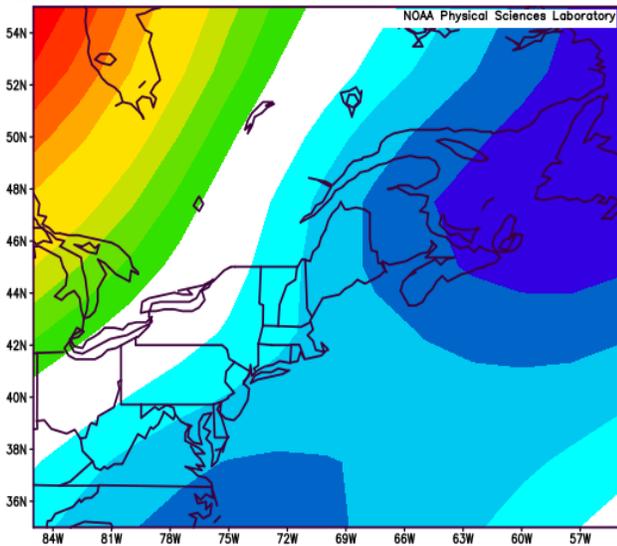


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo) May 2023

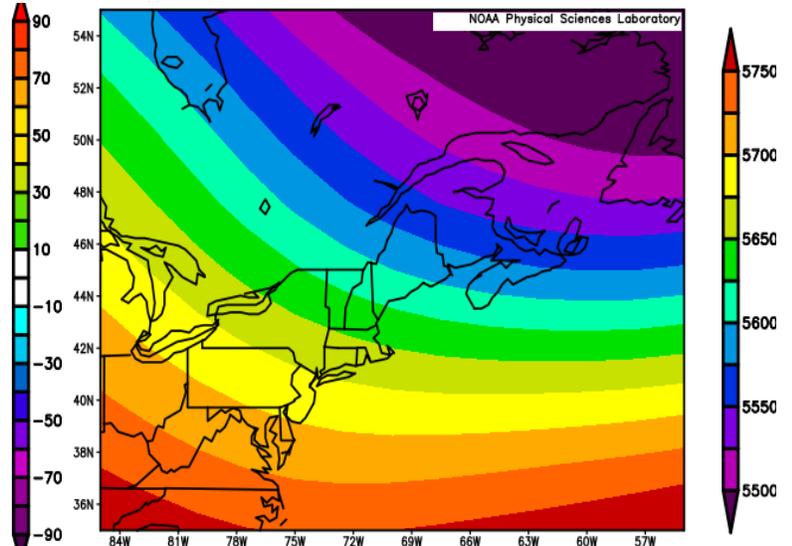


Figure 2: 500mb Geopotential Height (m) Composite Mean May 2023

Source: [NOAA Physical Sciences Laboratory](https://www.noaa.gov/physical-sciences-laboratory)

**Temperatures** for the month ranged from near average for Downeast and Central Highlands of the region to 1° below average across the Crown. Typical for May, day to day temperature departures ran up and down during the course of the month, with especially cool spells noted during the 16th through 18th and again during the 24th to 26th where daily temperature departures ran upwards to 10 to 15 degrees below average. Most locations experienced their lowest temperatures of the month around the freezing point on the 18th or 23rd. On the other side of the scale, warmest temperatures of the month were experienced on the 31st where many non-high terrain locations inland from the Downeast coast experienced afternoon highs of upper 80s to lower 90s with daily departures upwards to 15 to 20 degrees above average.

<i>Town/City</i>	<i>Avg Monthly Temperature (°F)</i>	<i>Normal Monthly Temperature (°F)</i>	<i>Departure from Normal (°F)</i>
<b>Frenchville</b>	50.9	51.7	-0.8
<b>Fort Kent</b>	48.8	49.4	-0.6
<b>Caribou</b>	51.7	52.2	-0.5
<b>Houlton</b>	51.0	51.2	-0.2
<b>Millinocket</b>	53.3	53.2	+0.1
<b>Greenville*</b>	52.0	51.4	+0.6
<b>Bangor</b>	54.6	54.5	+0.1
<b>Robbinston*</b>	51.4	51.7	-0.3
<b>Topsfield*</b>	52.9	52.9	0.0

*\*Topsfield Records date back to 2000, \*Robbinston Records date back to 1994*

*\*Greenville data gap between 1975 and 1999*

**Precipitation** for the month across the entire region ranged from 80 to 95 percent with significant daily amounts recorded across all or parts of the region on the 1st, 12th, 21st and 24th-25th. The last snow flurries of the previous cold season fell across the North during the cold blustery conditions experienced on the 17th. Total evaporation as measured at Caribou for May was approximately 5.40 inches. Total rainfall for Caribou for this same period was 2.79 inches, or about 52% of the total evaporation. At

Bangor, the total June rainfall was 2.95 inches, or only 55% of the proxy Caribou evaporation, meaning that much, if not all of our region experienced significant drying from typical wet conditions from “Mud Season” (snow and frost melt) in April. As noted above the last **Snowfall** was just flurries and Caribou finished below normal for snowfall in May. In Caribou, only a Trace of snow was observed with a monthly average of 0.8”. Caribou has only observed 23 years since 1940 with snowfall >Trace in the month of May and 30 years with exactly a Trace.

### **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*	1.92	3.07	-1.15	62.5%					
Fort Kent	2.29	3.31	-1.02	69.1%	0.0	0.1	-0.1	0	0
Caribou	2.79	3.46	-0.67	80.6%	T	0.8	-0.8	0	0
Houlton	2.94	3.46	-0.52	84.9%					
Millinocket*	3.17	3.42	-0.25	92.6%	0.0			0	0
Greenville*	3.71	3.59	+0.12	103.3%					
Bangor	2.95	3.34	-0.39	88.3%	0.0	0.0	0.0	0	0.0
Robbinston*	2.94	4.35	-1.41	67.6%	0.0	0.0	0.0	0	0
Topsfield*	3.17	4.23	-1.06	74.9%	0.0	0.8	-0.8	0	0

*\*Millinocket snowfall measured at CoOp site, not the ASOS site. Departure data is not available.*

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

**Streamflows** during the month fell rapidly with continued below normal precipitation that has been consistent since snow melt. For the month as a whole the streamflows were below normal to much below normal across the St. John & Aroostook River basins and St. Croix basin. In addition, the Mattawamkeag was much below normal for the month as a whole. Several river gages for several stretches were reporting their record lowest daily discharges. The St. Croix River at Baring experienced its Record Lowest Average May discharge on record dating back 62 years with the average discharge of 878.22cfs.

**Groundwater:** Thanks to the significant snowfall melt and precipitation at the end of 2022 and no significant hot stretches the groundwater levels were normal for the month of May. In fact, at the Calais gage the groundwater level was much above normal in the greater than 95th percentile. The Calais records date back 41 years.

In regards to **Drought** monitoring, the start of the month remained drought free but as noted above we saw rainfall deficits taking a toll on surface water across the state. This was mainly impacting the St. John, Aroostook & St. Croix basins and by the end of the month Abnormally Dry (D0) conditions developed.

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

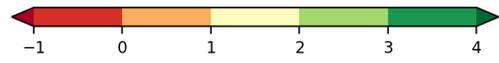
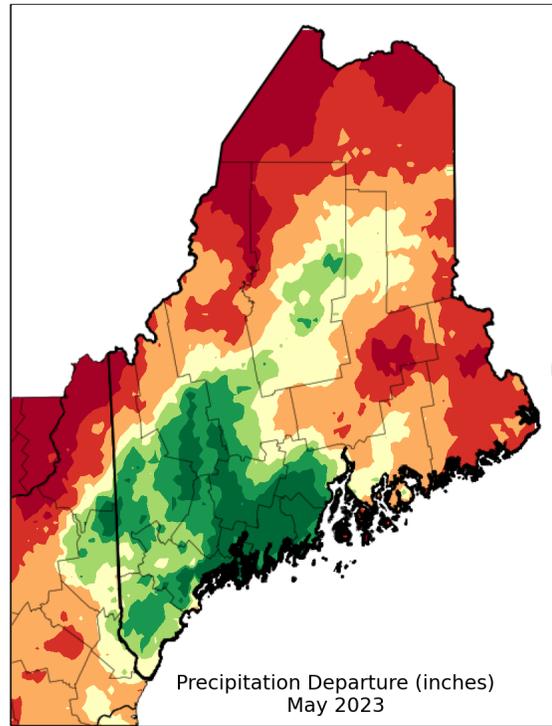
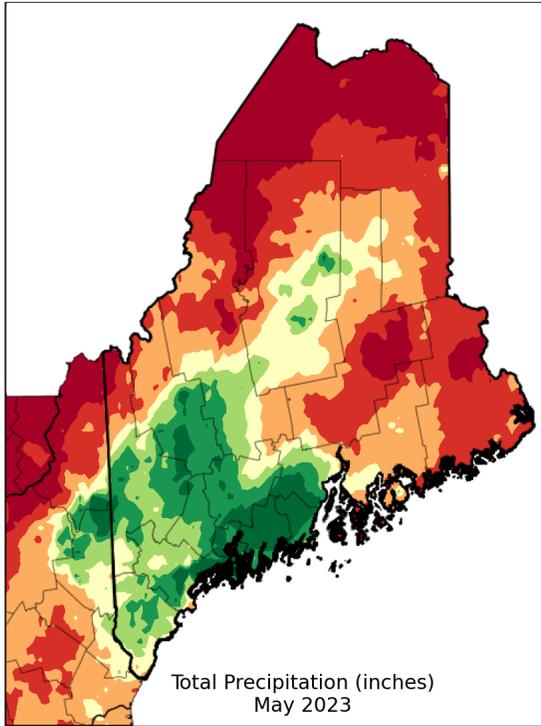


Figure 3: Monthly Precipitation Totals for May 2023

Figure 4: Monthly Precipitation Departures from Normal for May

Source: [Northeast Regional Climate Center](#)

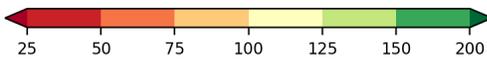
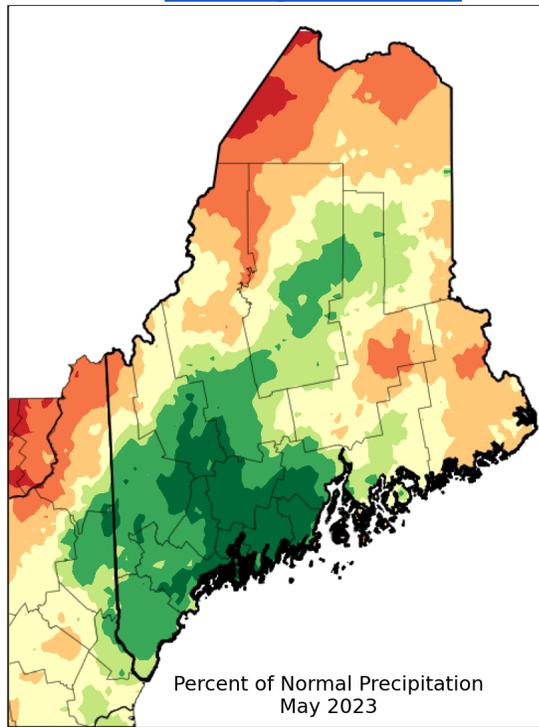


Figure 5: Percent of Normal Precipitation May 2023

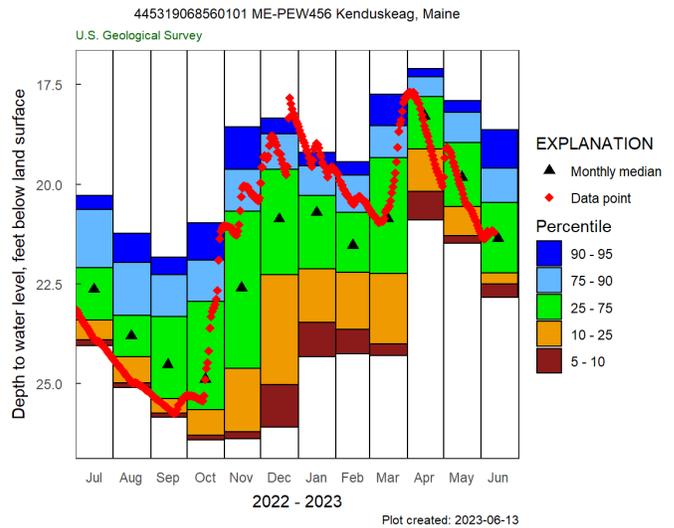
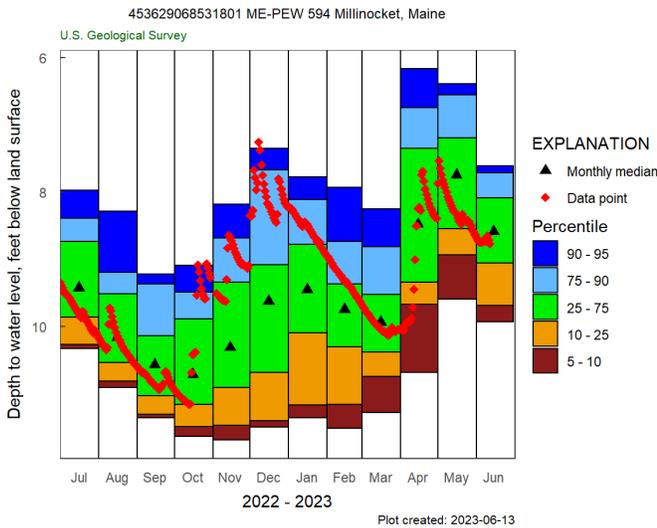
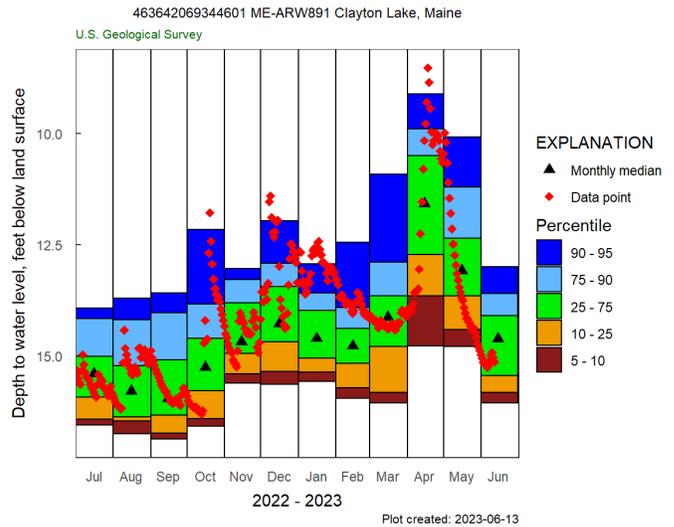
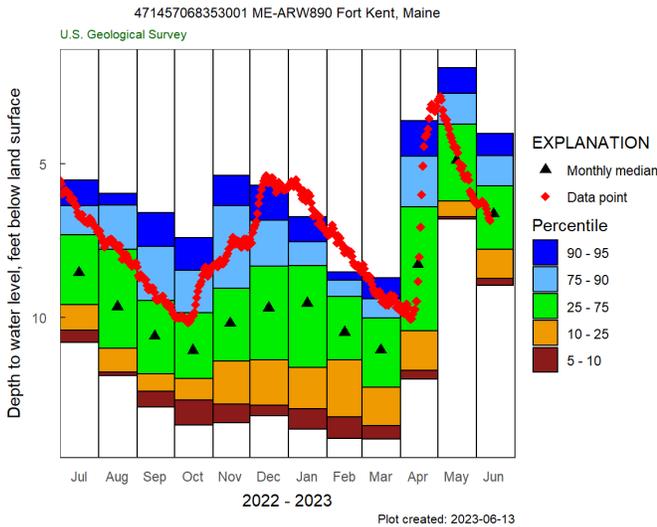
Source: [Northeast Regional Climate Center](#)

### May Streamflows for Rivers

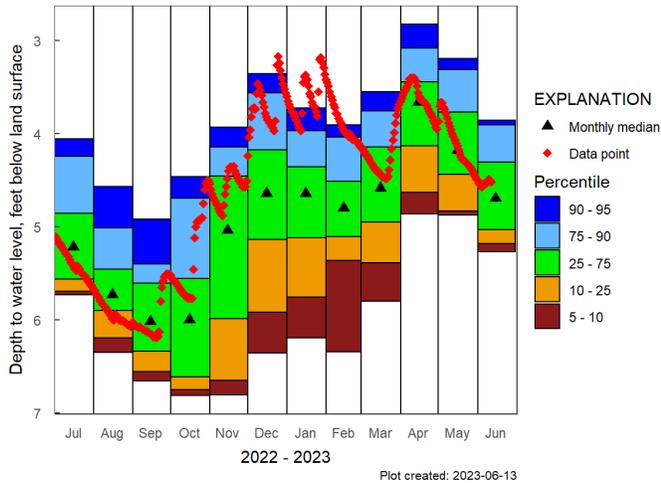
River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi <sup>2</sup> )	Years of Record
Big Black River near Depot Mtn	348.67	45.90%	Below Normal	171	38
St. John River at Nine Mile Bridge	3205.71	47.93%	Below Normal	1341	71
Allagash River near Allagash	3157.42	51.77%	Below Normal	1478	91
St. John River at Dickey	6399.03	43.81%	Much Below Normal	2680	76
St. John River at Fort Kent	8149.16	25.36%	Much Below Normal	5929	95
Fish River near Fort Kent	1667.38	33.69%	Much Below Normal	873	92
Aroostook River near Masardis	2118.29	52.05%	Below Normal	892	64
Aroostook River at Washburn	3701.94	49.42%	Much Below Normal	1654	91
St. Croix River at Vanceboro	370.21	36.26%	Below Normal	413	93
St. Croix River at Baring	878.22	23.64%	Low	1374	62
Grand Lake Stream at Grand Lake Stream	153.53	35.47%	Below Normal	228.3	93
Narraguagus River at Cherryfield	533.94	80.33%	Normal	227	74
East Branch Penobscot River at Grindstone	3155.81	65.84%	Normal	837	100
Mattawamkeag near Mattawamkeag	2266.97	42.35%	Much Below Normal	1418	87
Piscataquis River near Dover-Foxcroft	1258.55	104.83%	Normal	298	119
Sebec River at Sebec	1106.84	90.13%	Normal	326	67
Piscataquis River at Medford	4183.23	92.87%	Normal	1162	90
Penobscot River at West Enfield	16674.52	71.25%	Normal	6422	119

## May Average Groundwater Levels

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



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



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

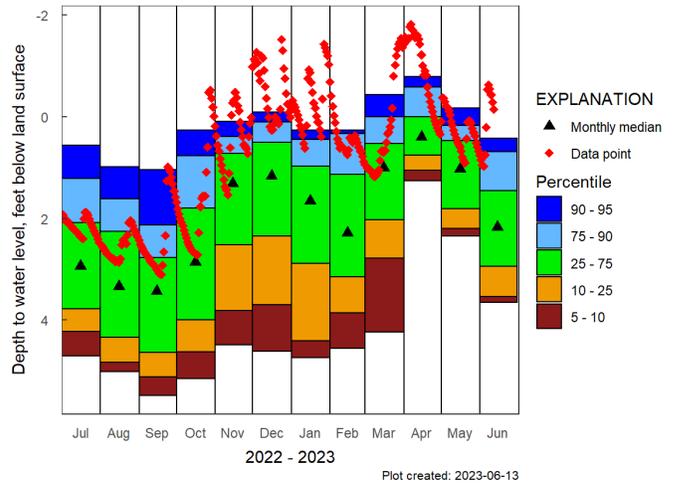


Figure 6-11: Groundwater Level Yearly Plots to Current  
Source: [United States Geological Survey](https://www.usgs.gov/)

Flow or Water Level	Percentile Range	Explanation
Low	0 <sup>th</sup>	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 <sup>th</sup> to 10 <sup>th</sup>	The monthly mean streamflow or median water level during this month is less than the 10 <sup>th</sup> percentile when compared to all of the months during the period of record for this site.
Below normal	10 <sup>th</sup> to 25 <sup>th</sup>	The monthly mean streamflow or median water level during this month is between the 10 <sup>th</sup> and 25 <sup>th</sup> percentiles when compared to all of the months during the period of record for this site.
Normal	25 <sup>th</sup> to 75 <sup>th</sup>	The monthly mean streamflow or median water level during this month is between the 25 <sup>th</sup> and 75 <sup>th</sup> percentiles when compared to all of the months during the period of record for this site.
Above normal	75 <sup>th</sup> to 90 <sup>th</sup>	The monthly mean streamflow or median water level during this month is between the 75 <sup>th</sup> and 90 <sup>th</sup> percentiles when compared to all of the months during the period of record for this site.
Much above normal	90 <sup>th</sup> to 100 <sup>th</sup>	The monthly mean streamflow or median water level during this month is greater than the 90 <sup>th</sup> percentile when compared to all of the months during the period of record for this site.
High	100 <sup>th</sup>	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  
May 2023  
WFO Caribou, ME**

Product	How Many Issued	Reason for Issuance
Flood Advisory	2	Excessive Rainfall
Flood Warning	1	Urban & Small Stream Flooding
Flood Warning ( <i>River</i> )	1	Piscataquis River Flooding @ Dover-Foxcroft

## May Flooding Events

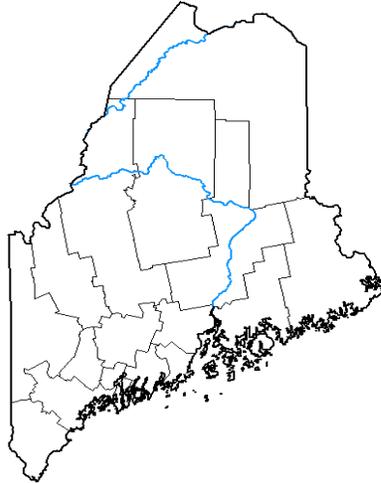
There was a significant rainfall event that began overnight into the morning on May 1st mostly impacting the NWS Gray area, however we saw heavy rain in the headwaters and central stretches of the Piscataquis River basin into the Bangor area. Rainfall of 1.5-3.5” fell across the area prompting the issuance of Flood Advisories across the area. Images below thanks to Piscataquis County Emergency Management of flooding on Back Abbot Road in Abbot caused by the Piscataquis River.



# Drought Conditions for May 2023

## U.S. Drought Monitor Maine

**May 2, 2023**  
(Released Thursday, May 4, 2023)  
Valid 8 a.m. EDT



**Intensity:**

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

**Author:**

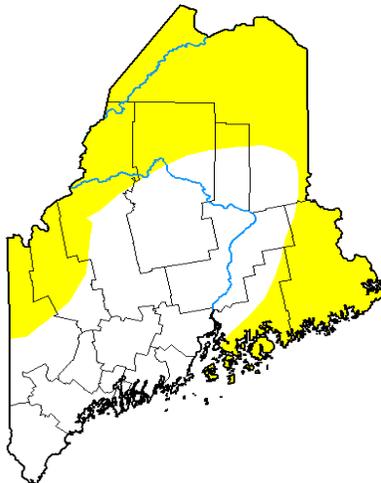
Brad Pugh  
CPC/NOAA



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

## U.S. Drought Monitor Maine

**May 30, 2023**  
(Released Thursday, Jun. 1, 2023)  
Valid 8 a.m. EDT



**Intensity:**

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

**Author:**

Richard Heim  
NCEI/NOAA



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

### Drought Classification (Cumulative Percent Area %)

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
5/2/2023	100.00	0.00	0.00	0.00	0.00	0.00	0
5/30/2023	51.24	48.76	0.00	0.00	0.00	0.00	49
Change	-48.76	48.76	0.00	0.00	0.00	0.00	49

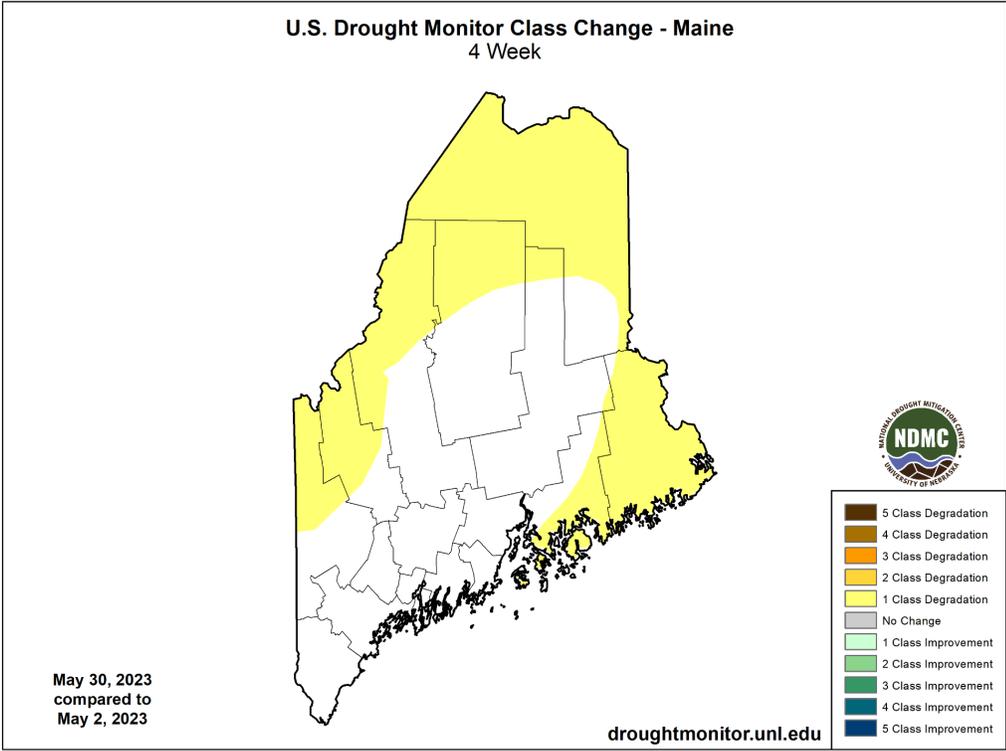


Figure 12-14: U.S. Drought Monitor Drought Classification & Statistics for May  
Source: [U.S. Drought Monitor](https://droughtmonitor.unl.edu)