

# MONTHLY REPORT OF HYDROLOGIC CONDITIONS

**WFO Caribou, Maine**

REPORT FOR:  
MONTH YEAR

**March 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

**April 21, 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).*

X

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

## March 2023

March 2023 was warmer than average compared to the 1991-2020 climate normals. It featured a lack of arctic air and temperatures were above to well above average the first half of the month and much closer to average the second half of the month. This was a result of the monthly average of the North Atlantic Oscillation (NAO) pattern of -1.11 standard deviation, while the Pacific North American (PNA) pattern at -1.61 standard deviation. This typically results in much lower 500mb heights over the North Atlantic extending westward into the Northeastern states. This is depicted below in the reanalysis of the monthly anomaly of the 500mb Geopotential Heights and the mean heights. We saw anomalous lower heights for the month over the area with strong blocking in the North Atlantic with overall troughing over the area.

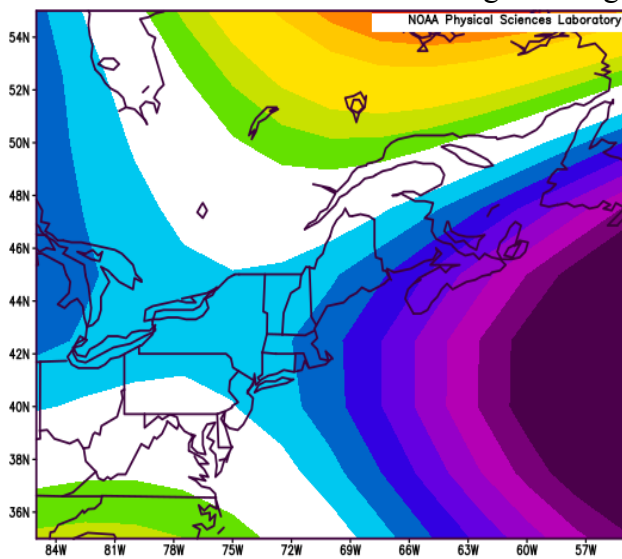


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo)  
March 2023

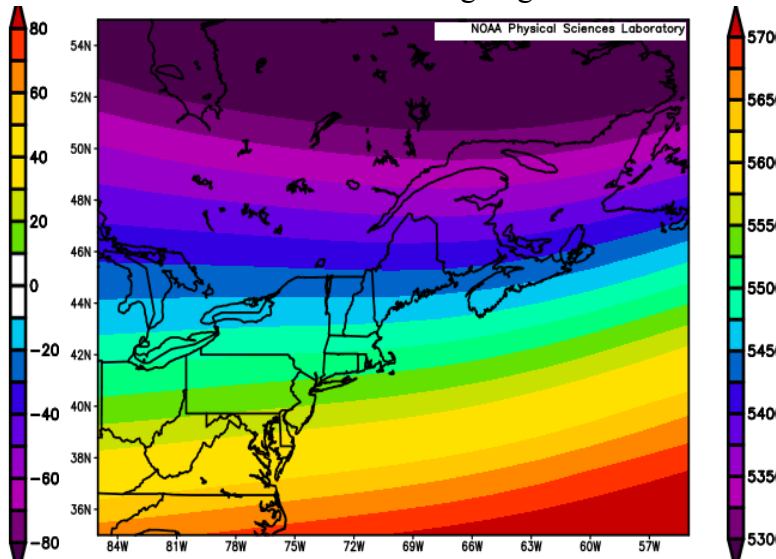


Figure 2: 500mb Geopotential Height (m) Composite Mean  
March 2023

Source: [NOAA Physical Sciences Laboratory](#)

**Temperatures** the region as a whole averaged from 2.5 to 4 degrees above the 1991-2020 averages. There was a lack of arctic air and temperatures were above to well above average the first half of the month and much closer to average the second half of the month. There was only one night with a low temperature below zero in Caribou. On average, there are 4 nights with a low below zero during the month of march in Caribou. In Bangor, the low for the entire month was 10°F on the 5th. Although not a record, typically Bangor will have a night or two with a low below zero during the month of March.

<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>	27.3	24.5	+2.8
<b>Fort Kent</b>	25.0	20.9	+4.1
<b>Caribou</b>	28.3	25.0	+3.3
<b>Houlton</b>	29.2	25.5	+3.7
<b>Millinocket</b>	31.3	27.6	+3.7
<b>Greenville*</b>	29.5	25.6	+3.9
<b>Bangor</b>	33.6	30.6	+3.0
<b>Robbinston*</b>	33.9	30.8	+3.1
<b>Topsfield*</b>	31.7	27.4	+4.3

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

*\*Greenville data gap between 1975 and 1999*

**Precipitation** total precipitation for the month ranged from 40 to 75 percent of average, except across parts of the western Saint John Valley and North Woods where precipitation ranged from 100 to 150 percent of normal. **Snowfall** was above average across the region. In Caribou, a total of 29.6 inches was observed, which was 8.2 inches above average. In Bangor, 20.5 inches of snow was observed which was 5.3 inches above average. By the end of the month, the **Snow Depth** ranges from 18 to 44 inches across Aroostook County with the highest amounts across the higher terrain to the west of Caribou. By the end of the month Snow Depth was reported at 66 inches at Chimney Pond (~3,000ft elevation) in Baxter State Park. At the end of the month there was 3 inches of snow on the ground at Millinocket, and little to no snow was observed in Bangor and along the coast. The **Snow Water Equivalent** across northern areas ranged from 6 to 11 inches by the end of the month, with locally higher amounts across the higher terrain. See the table below for more details on exact totals.

### 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*	0.75	1.47	-0.72	51%					
Fort Kent	1.93	2.75	-0.82	70.2%	24.0	19.0	+5.0	32	23.6
Caribou	2.26	2.77	-0.51	81.6%	29.6	21.4	+8.2	27	18.7
Houlton	1.54	2.67	-1.13	57.7%					
Millinocket*	1.93	2.97	-1.04	65%	12.0			18	10.6
Greenville*	2.30	3.19	-0.89	72.1%					
Bangor	1.72	3.22	-1.50	53.4%	20.5	15.2	+5.3	15	4.3
Robbinston*	3.37	4.82	-1.45	69.9%	20.2	18.9	+1.3	21	11.5
Topsfield*	2.73	4.54	-1.81	60.1%	22.9	19.6	+3.3	25	14.2

\*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

\*Frenchville ASOS has Known Issues Measuring Liquid Equivalent of Snowfall due to Blowing & Drifting

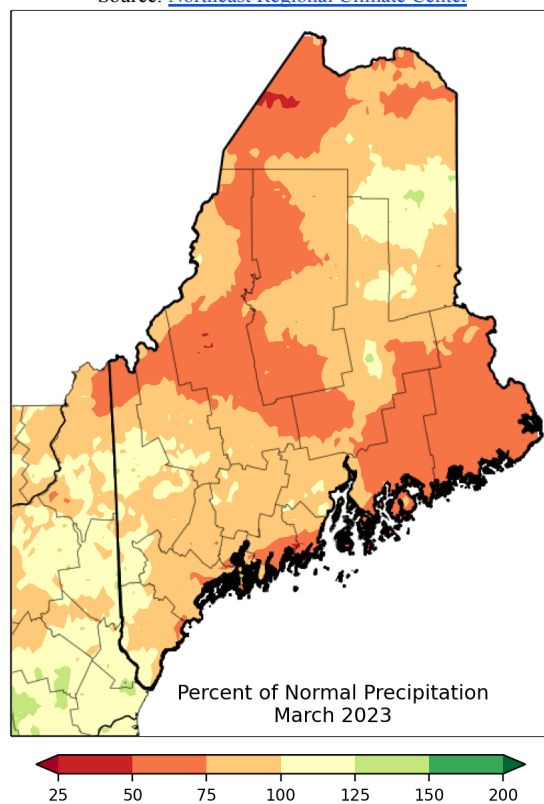
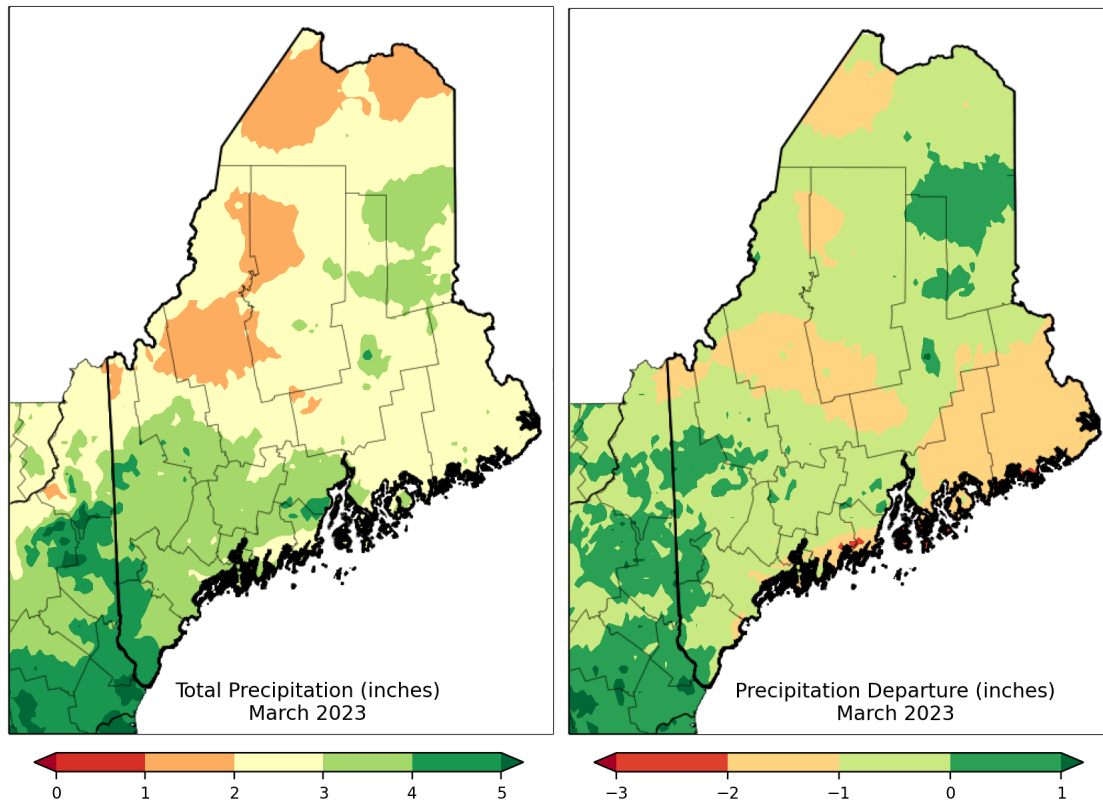
**Streamflows** during the month continued to fall with much of the northern and central basins covered in ice while southern basins were melting and clearing of ice. Flows increased where ice & snow melted while flows decreased with little to no melt across the north. Overall the basins averaged normal for the entire month. The exception was the St. John at Fort Kent ranked Much Below Normal for the month at the site specifically.

**Ice:** Across southern basins we saw significant ice loss in the first couple weeks of the month becoming free and clear by late month. Central basins had significant ice cover during the beginning of the month with significant rot and decay by late month. Northern basins were nearly fully frozen during the entire month, however rot was noted with some openings by late month. By late month the Aroostook River was wide open from Scopan Stream downstream through Ashland into Castle Hill. Additional openings were noted in Presque Isle and Caribou. Across the St. John we saw openings from Fort Kent to Madawaska with significant openings from Madawaska downstream for a couple river miles.

**Groundwater:** Ground continued to thaw from the bottom up across much of the north that had deep snowpack. Given no significant melting in the north the groundwater levels didn't change too much but still resulted in Much Above Normal values in the St. John Valley, elsewhere we saw normal conditions.

In regards to **Drought** monitoring, the entire month of March featured No Drought conditions.

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

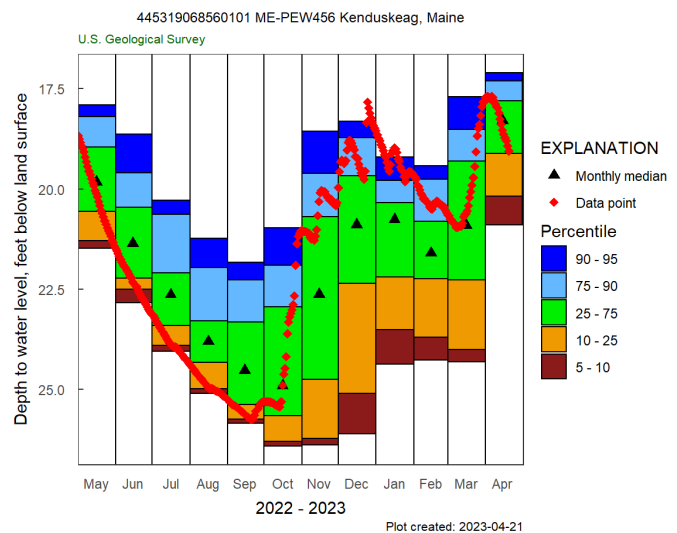
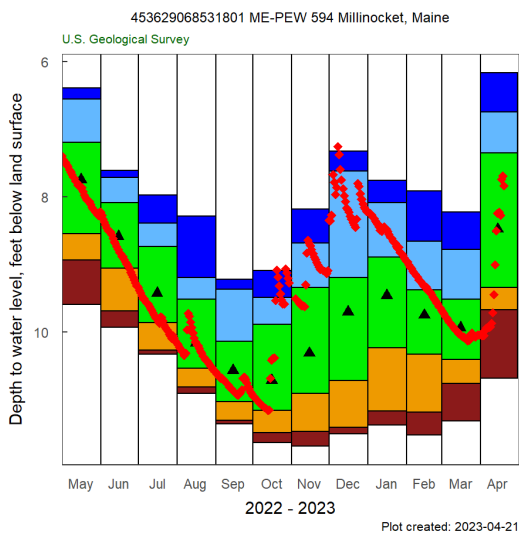
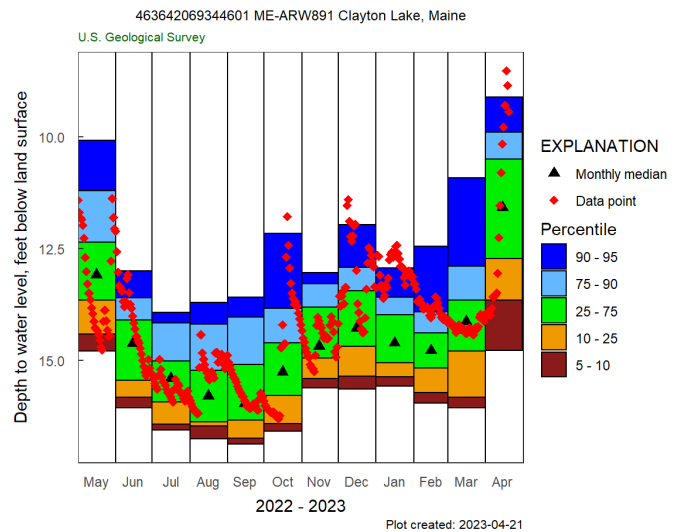
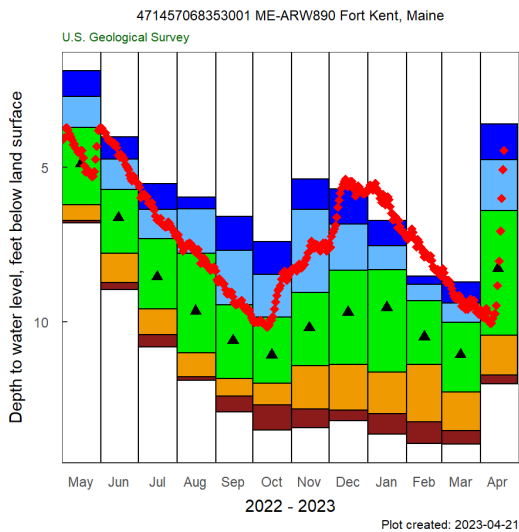


### March Streamflows for Rivers

River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi <sup>2</sup> )	Years of Record
Big Black River near Depot Mtn	NA	NA	Ice Affected	171	38
St. John River at Nine Mile Bridge	NA	N/A	Ice Affected	1341	71
Allagash River near Allagash	NA	NA	Ice Affected	1478	90
St. John River at Dickey	NA	NA	Ice Affected	2680	75
St. John River at Fort Kent	1178.75	29.33%	Much Below Normal	5929	95
Fish River near Fort Kent	NA	NA	Ice Affected	873	92
Aroostook River near Masardis	653.19	72.02%	Normal	892	64
Aroostook River at Washburn	NA	NA	Ice Affected	1654	91
St. Croix River at Vanceboro	637.89	86.62%	Normal	413	93
St. Croix River at Baring	1419.92	44.82%	Much Below Normal	1374	62
Grand Lake Stream at Grand Lake Stream	209.70	43.16%	Below Normal	228.3	93
Narraguagus River at Cherryfield	551.52	75.16%	Normal	227	74
East Branch Penobscot River at Grindstone	4128.57	NA	Ice Affected	837	100
Mattawamkeag near Mattawamkeag	1662.52	70.63%	Normal	1418	87
Piscataquis River near Dover-Foxcroft	434.00	71.53%	Normal	298	119
Sebec River at Sebec	445.90	73.68%	Normal	326	67
Piscataquis River at Medford	4184.29	NA	Ice Affected	1162	90
Penobscot River at West Enfield	20742.86	NA	Ice Affected	6422	119

## March Average Groundwater Levels

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



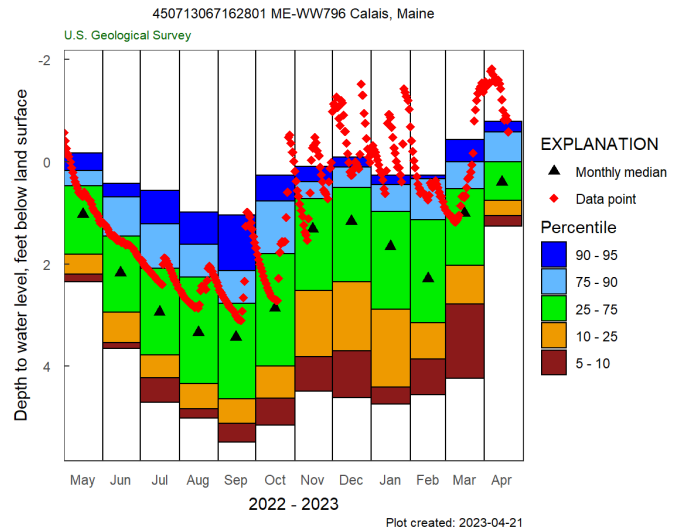
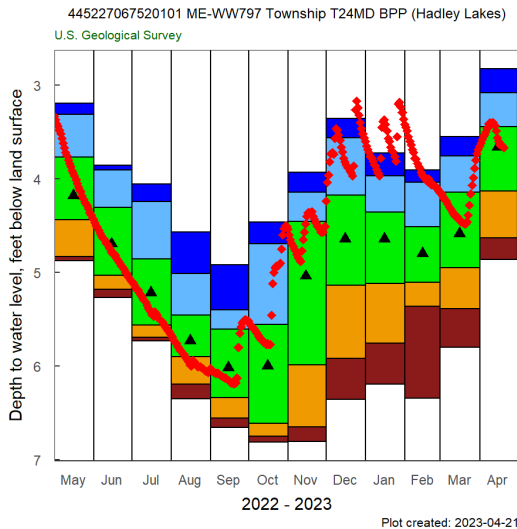


Figure 6-11: Groundwater Level Yearly Plots to Current  
Source: [United States Geological Survey](https://www.usgs.gov/)

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.

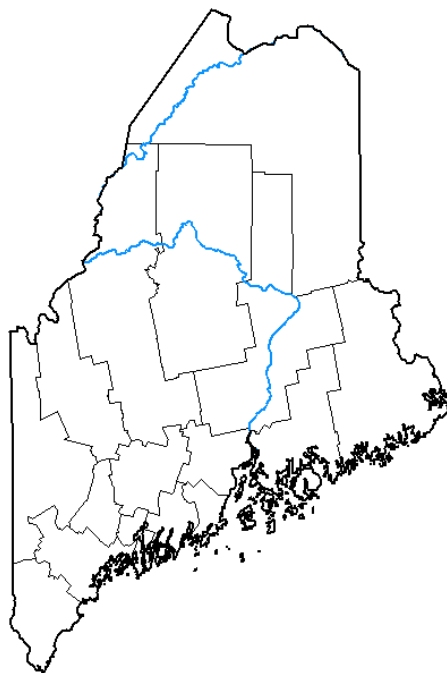
**Non-Routine Hydrologic Products  
March 2023  
WFO Caribou, ME**

**No Non-Routine Products were issued in March 2023**







**Drought Conditions for March 2023**

***U.S. Drought Monitor*  
Maine**

**March 7, 2023**  
(Released Thursday, Mar. 9, 2023)  
Valid 7 a.m. EST



***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:***

Deborah Bathke  
National Drought Mitigation Center

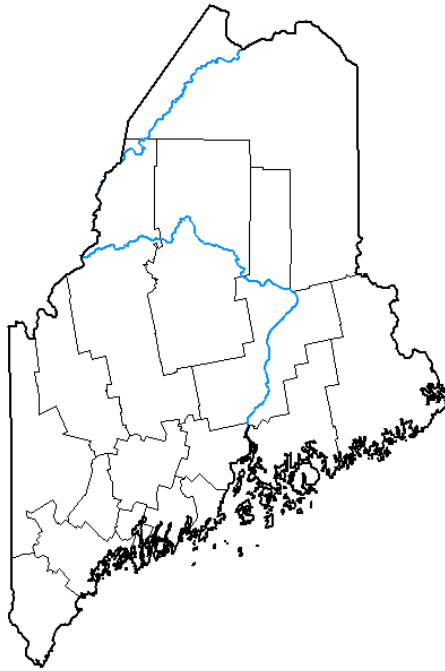


**[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)**



**U.S. Drought Monitor**  
**Maine**

**March 28, 2023**  
(Released Thursday, Mar. 30, 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:**

Curtis Riganti  
National Drought Mitigation Center



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

**Drought Classification (Cumulative Percent Area %)**

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
3/7/2023	100.00	0.00	0.00	0.00	0.00	0.00	0
3/28/2023	100.00	0.00	0.00	0.00	0.00	0.00	0
Change	0.00	0.00	0.00	0.00	0.00	0.00	0

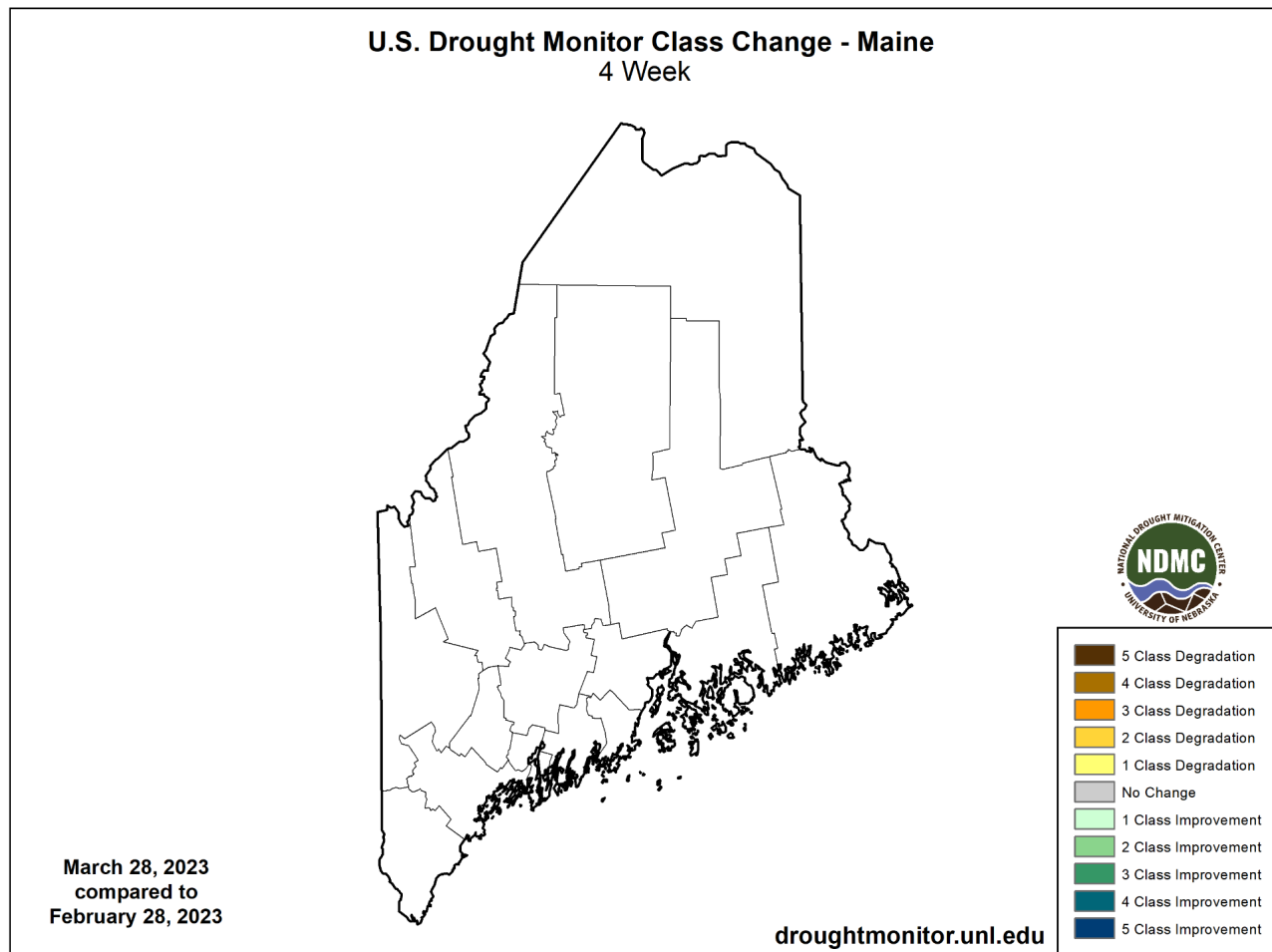


Figure 12-14: U.S. Drought Monitor Drought Classification & Statistics for March  
Source: [U.S. Drought Monitor](https://droughtmonitor.unl.edu)