

<b>NWS Form E-5</b> (04-2006) (PRES. BY NWS Instruction 10-924)	U.S. DEPARTMENT OF COMMERCE <b>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</b> <b>NATIONAL WEATHER SERVICE</b>	HYDROLOGIC SERVICE AREA (HSA)  <b>WFO Caribou, Maine</b>
<b>MONTHLY REPORT OF HYDROLOGIC CONDITIONS</b>	REPORT FOR: MONTH                      YEAR  <b>February                      2024</b>	
	SIGNATURE  <b>James Sinko - Meteorologist</b> <b>Hydrology Program Manager</b>	
	DATE  <b>March 8, 2024</b>	

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.

### February 2024

February 2024 featured very warm weather conditions with well below normal precipitation and snowfall. There were brief arctic intrusions that allowed for some continued ice development but by late month we began our thaw/ice out process well ahead of normal. A pattern shift took place in February with a stronger North Atlantic Oscillation (NAO) monthly mean around +1.09SD. At the same time the Pacific North American Pattern (PNA) shifted into brief swings between positive and negative resulting in a neutral monthly mean of +0.09SD. This pattern resulted within a weakening strong positive El Niño-Southern Oscillation (ENSO) eastern regime. This anomalously higher 500mb heights over Maine in the month of February as seen below. The mean 500mb trough shifted eastward with the axis over the Gulf of Maine waters near Nova Scotia that resulted in several progressive systems during the month with no large scale storm systems. The favored system in the month of February was Alberta Clippers across the area which resulted in very little snowfall.

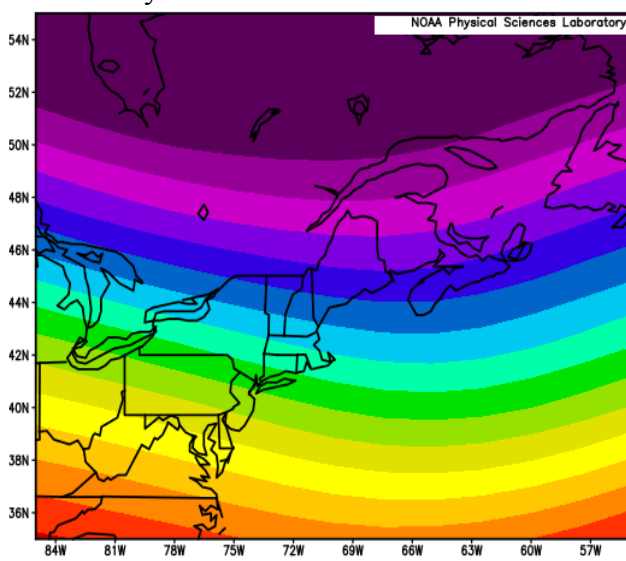


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo)  
 February 2024

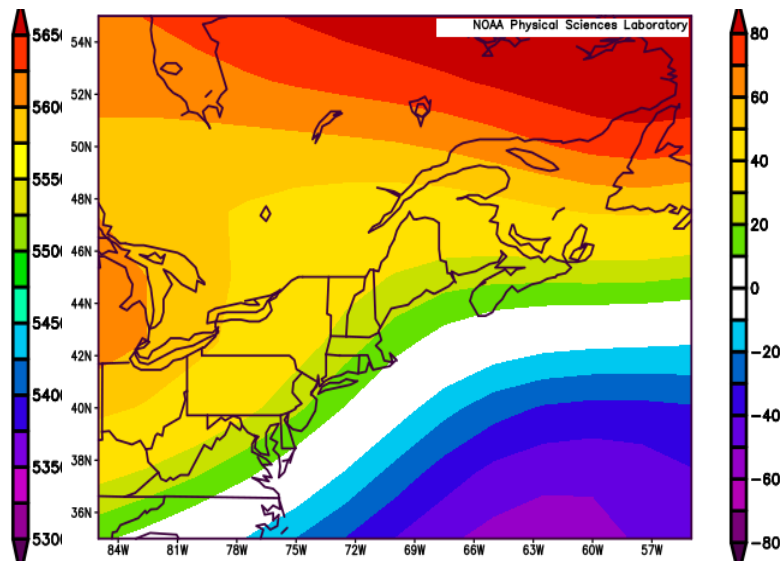


Figure 2: 500mb Geopotential Height (m) Composite Mean  
 February 2024

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

### Precipitation Totals for Select Locations with all units in inches

Location	Total Precip	Normal Precip	Departure from Normal	% of Normal	Snowfall	Normal Snowfall	Departure from Normal	Greatest Snow Depth	Monthly Average Snow Depth
Frenchville*	0.70	0.87	-0.17	80.5%					
Fort Kent	0.72	2.34	-1.62	30.8%	4.7	21.0	-16.3	16	11.2
Van Buren	1.14	2.27	-1.13	50.2%	7.5	20.0	-12.5	15	7.4
Caribou	1.29	2.42	-1.13	53.3%	8.7	25.3	-16.6	15	8.5
Houlton	1.20	1.95	-0.75	61.5%					
Millinocket*	1.07	2.70	-1.63	39.6%	4.0			13	8.3
Greenville*	1.02	2.41	-1.39	42.3%					
Moosehead*	0.33	2.27	-1.94	14.5%	1.5	21.6	-20.1	16	13.3
Corinna	1.26	2.82	-1.56	44.7%	1.8	17.2	-15.4	7	5.3
Bangor	1.37	2.38	-1.01	57.6%	1.2	17.5	-16.3	5	1.3
Grand Lake Stream	2.13	3.28	-1.15	64.9%	2.0	19.9	-17.9	3	0.9
Robbinston*	3.10	4.17	-1.07	74.3%	2.9	21.9	-19.0	5	2.4
Topsfield*	1.49	3.62	-2.13	41.2%	4.7	27.4	-22.7	8	5.4

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

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

*\*Frenchville ASOS has documented issues with precipitation measurements in the winter months.*

**Precipitation** (Snow melt included) was well below average for the entire region, generally 40-75% of normal. **Snowfall** was well below average once again which has been the theme this winter. It was the 2nd least snowy February on Record in Bangor with only 1.2 inches of snow. The only year on record with less snowfall in February was in 1998 when an inch was observed. It is interesting to note that February 1998 was also a Strong El Nino in progress that was in the weakening phase similar to this year. In Caribou, only 8.7 inches of snow was observed which made it the 7th least snowy February on record. At the start of the month snow depth ranged from 8-18" across the North Woods, Moosehead & Baxter Regions north into much of the Crown. Snow depth of 6-12" across the Central Highlands into the Greater Bangor area with 2-6" for much of the Downeast region. Snow water equivalent to start the month was generally near normal to slightly below normal across the area with well below normal for far Eastern Maine in Washington County. A big warm-up at the end of the month combined with rain caused much of the snow across Northern areas to melt. By the end of the month the snow depth across the region ranged from zero to an inch in Bangor and along the coast (Due to Rain changing to Snow during the evening of the 29th). Across the Central Highlands and Northern Maine, the snow depth ranged from 2-8 inches, but locally a foot or more across the highest terrain. The warm-up and rain at the end of the month wiped out so much of the snowpack across northern areas that the snowmobile trails became poor and in most areas the snowmobile season ended. The lack of snow had significant implications for winter recreational activities causing many to be postponed or canceled.

**Streamflows...** natural flows continued to fall back to normal across much of the river basins with water levels dramatically becoming below normal across the St. John with the Fort Kent USGS gage reporting much below normal for the month of February. There was a response on the last day of the month with natural flows rising thanks to rainfall and snowmelt across the region.

In terms of **River Ice** we saw growth in the ice conditions through to the end of the month. Brief cold mornings allowed for significant ice growth on the St. John River and Aroostook Rivers thanks to little snow cover which typically acts like a “blanket” on the ice. Much of the ice that developed was weaker “grey ice” thanks to all that frazil ice production in January. On February 7th at the headwaters of the North Branch of the Penobscot the USGS found the river 95% ice covered with average ice thickness of 8 inches. On the same day the USGS found the Piscataquis River at Dover-Foxcroft 100% ice covered with an average ice thickness of 12 inches with very little snow cover. On February 20th, the USGS found the East Branch of the Penobscot in Grindstone 100% ice covered with an average ice thickness of 13 inches. Additional measurements were taken at Shin Pond on the Sebois River (100% ice covered & avg thickness of 16”), Aroostook River @ Masardis was 100% covered with a thickness of 14 inches and then the Little Madawaska River in Caribou was 100% covered with a thickness of 14 inches. On February 21st the USGS found the St. John River at Dickey to be 90% ice covered at the gage with 100% cover upstream and the average thickness of 18 inches. A very unusual sight this year was the ice status at the Dickey Bridge, it never froze 100% which was very abnormal speaking to local long time residents. On that day the Allagash River above Allagash was nearly 100% frozen with an average thickness of 14 inches. On February 22nd the USGS found the Meduxnekeag River above South Branch near Houlton to be 100% ice covered with a thickness of 10 inches. Lastly, measurements taken on the Wytopitlock Stream near Wytopitlock was found to be 13 inches and 100% ice covered. On the last day of the month with snow melt + rainfall runoff there was significant melting snow on ice, decaying ice, rotting ice and banking openings developing on many rivers. The Piscataquis River saw significant ice break up and movement from the upper stretches and pushed down to downstream dams.

**Groundwater** was above normal across Eastern Maine, Central Highlands and much of the Crown. It was below normal across the far North Woods and Normal for the Greater Bangor area. In Northern Maine we saw generally significant frost depth penetration thanks to little snowpack (deep snow acts as a blanket). The depth increased to 10-20 inches by the end of the month across the north, 9-15 inches across the Central Highlands and 6-14 inches across the Downeast. Here at the National Weather Service Weather Forecast Office in Caribou we went from a frost depth of 13 inches on February 6th to 18 inches by February 29th.

**Temperatures...** across the area ranged mainly from 5.5 to 7.5 degrees above 1991-2020 normals. It ranked as the 5th warmest February on Record at both Caribou and Houlton, and as the 4th warmest in Millinocket, and the 9th warmest in Bangor.

<b>Town/City</b>	<b>Avg Monthly Temperature (°F)</b>	<b>Normal Monthly Temperature (°F)</b>	<b>Departure from Normal (°F)</b>
<b>Frenchville</b>	20.5	14.0	<b>6.5</b>
<b>Fort Kent</b>	16.2	10.0	<b>6.2</b>
<b>Van Buren</b>	16.5	8.9	<b>7.6</b>
<b>Caribou</b>	21.4	14.2	<b>7.2</b>
<b>Houlton</b>	21.6	14.8	<b>6.8</b>
<b>Millinocket</b>	24.8	17.6	<b>7.2</b>
<b>Greenville*</b>	22.6	16.3	<b>6.3</b>
<b>Moosehead</b>	19.8	14.3	<b>5.5</b>
<b>Corinna</b>	25.4	19.3	<b>6.1</b>
<b>Bangor</b>	26.9	21.0	<b>5.9</b>
<b>Grand Lake Stream</b>	23.4	20.1	<b>3.3</b>
<b>Robbinston*</b>	27.7	22.1	<b>5.6</b>
<b>Topsfield*</b>	23.3	18.8	<b>4.5</b>

*\*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*

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



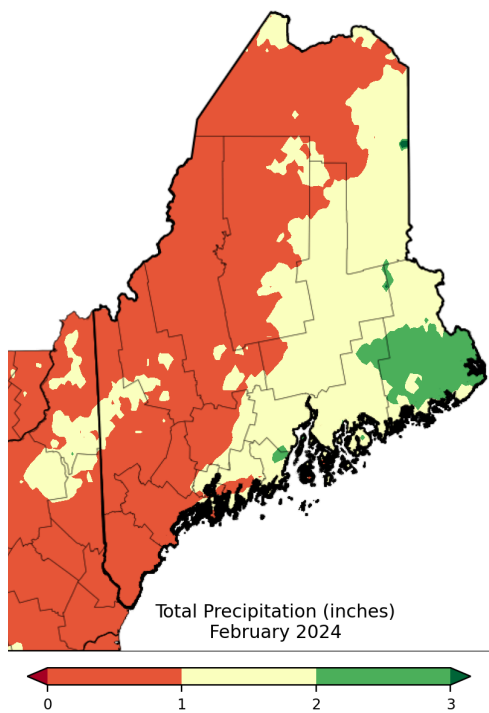


Figure 3: Total Liquid Precipitation for February

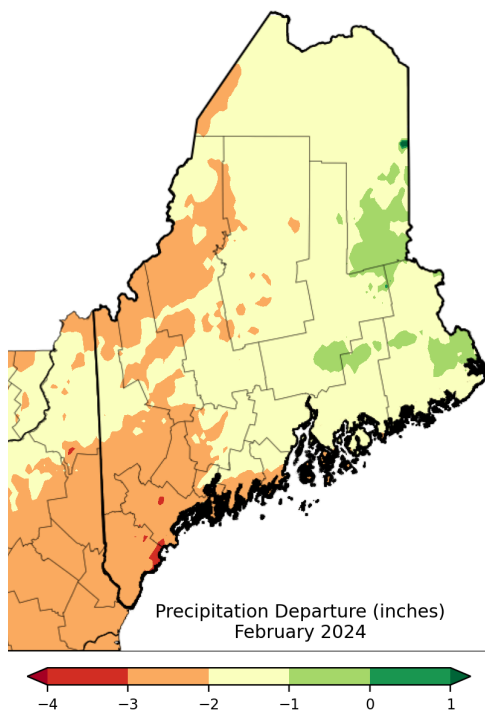


Figure 4: Liquid Precipitation Departure for February  
Source: [Northeast Regional Climate Center](#)

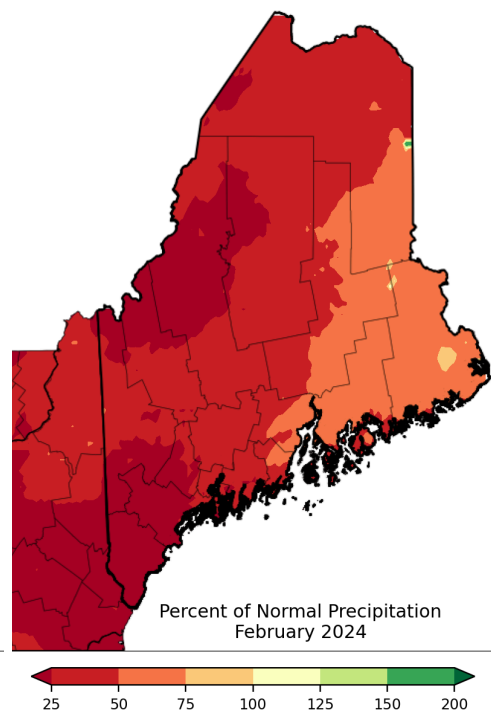


Figure 5: Percent of Normal Precipitation for February

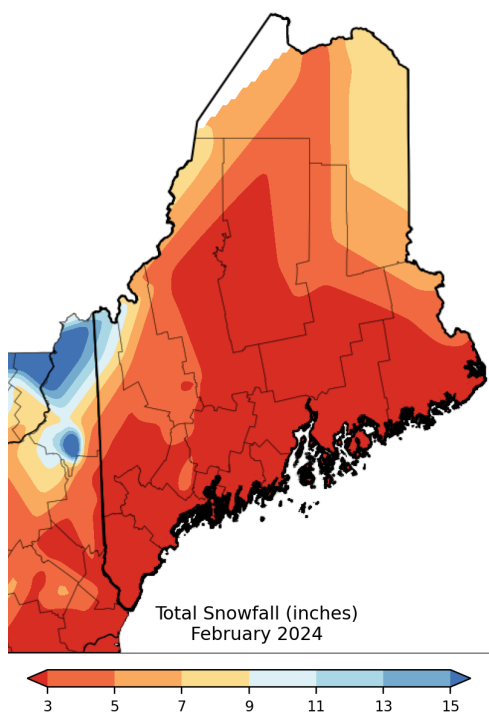


Figure 6: Total Snowfall for February

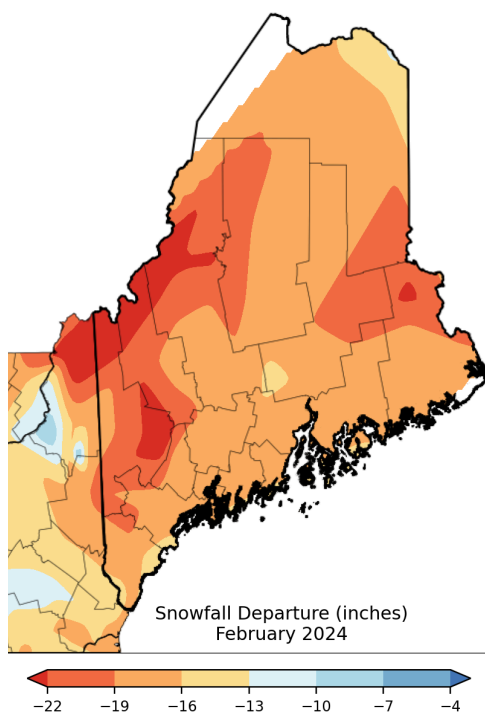


Figure 7: Total Snowfall Departure for February  
Source: [Northeast Regional Climate Center](#)

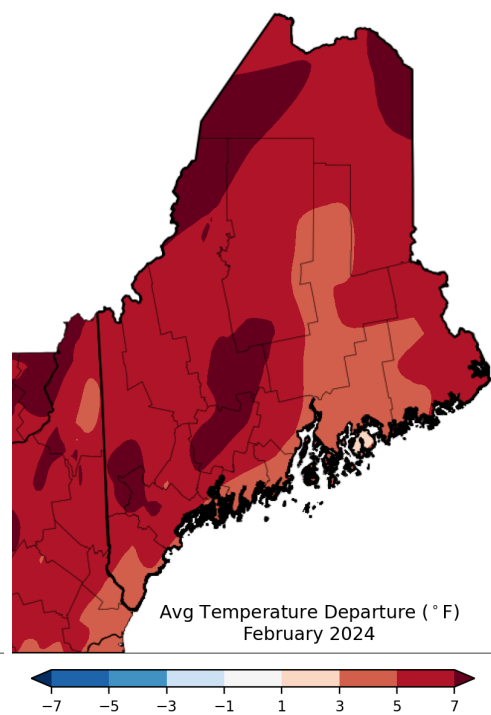


Figure 8: Average Temperature Departure for February

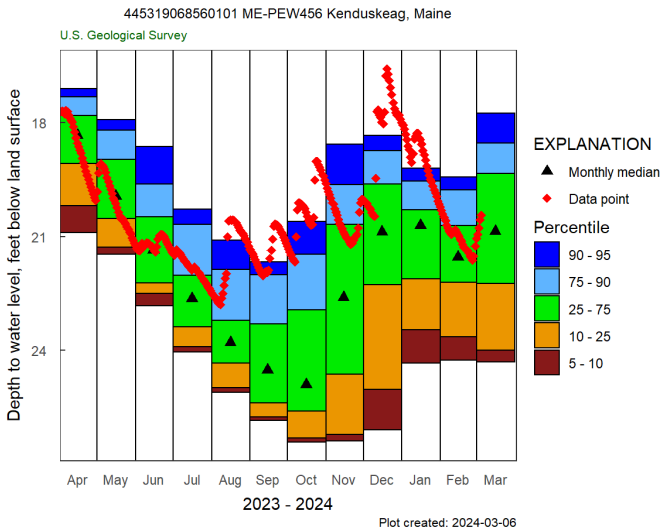
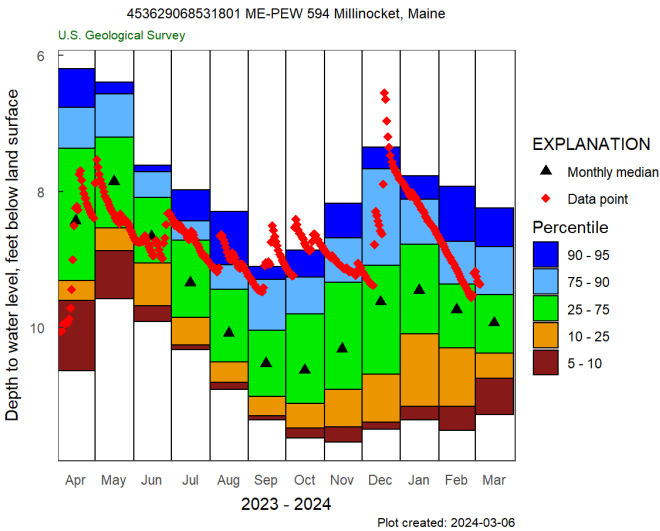
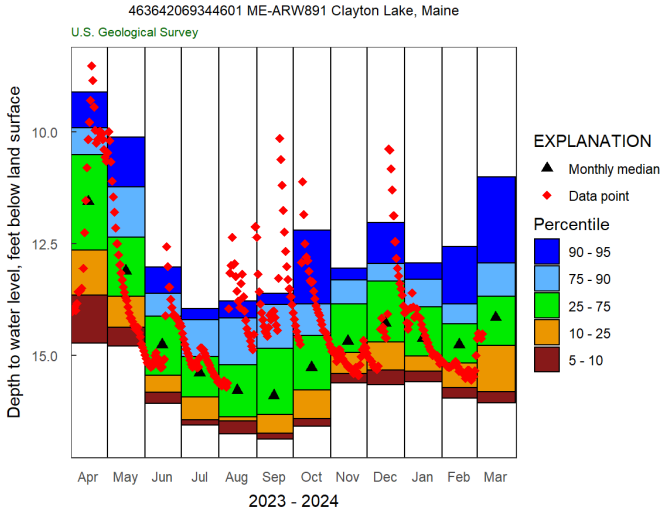
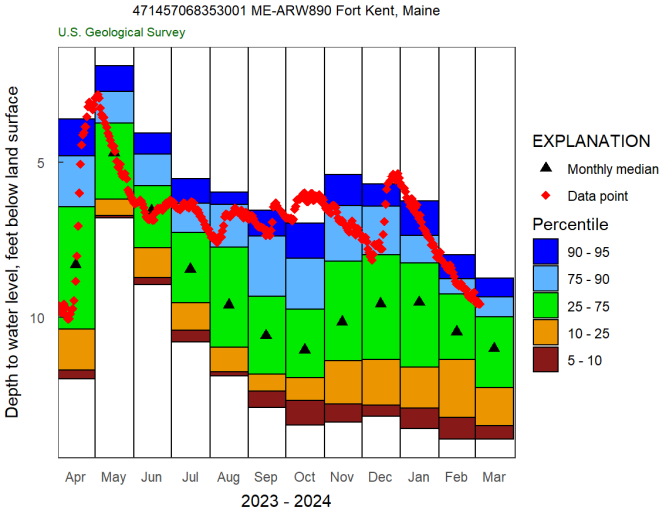
### February Streamflows for Rivers

\*Data provided by the U.S. Geological Survey\*

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 Impacted	171	39
St. John River at Nine Mile Bridge	NA	NA	Ice Impacted	1341	72
Allagash River near Allagash	NA	NA	Ice Impacted	1478	93
St. John River at Dickey	612.76	49.59%	Normal	2680	76
St. John River at Fort Kent	643.91	23.93%	Much Below Normal	5929	96
Fish River near Fort Kent	NA	NA	Ice Impacted	873	93
Aroostook River near Masardis	NA	NA	Ice Impacted	892	65
Aroostook River at Washburn	NA	NA	Ice Impacted	1654	92
St. Croix River at Vanceboro	591.39	67.57%	Normal	413	94
St. Croix River at Baring	1594.53	61.15%	Below Normal	1374	63
Grand Lake Stream at Grand Lake Stream	291.12	60.67%	Normal	228.3	94
Narraguagus River at Cherryfield	NA	NA	Ice Impacted	227	74
East Branch Penobscot River at Grindstone	861.05	82.97%	Normal	837	101
Mattawamkeag near Mattawamkeag	754.55	57.76%	Normal	1418	88
Piscataquis River near Dover-Foxcroft	272.03	97.44%	Normal	298	120
Sebec River at Sebec	383.90	80.85%	Normal	326	67
Piscataquis River at Medford	NA	NA	Ice Impacted	1162	91
Penobscot River at West Enfield	NA	NA	Ice Impacted	6422	120

February Average Groundwater Levels

Station	Percentile Class	Years of Record
Hadley Lakes	Above Normal	38
Kenduskeag	Normal	45
Calais	Above Normal	24
Millinocket	Above Normal	29
Clayton Lake	Below Normal	45
Fort Kent	Above Normal	45



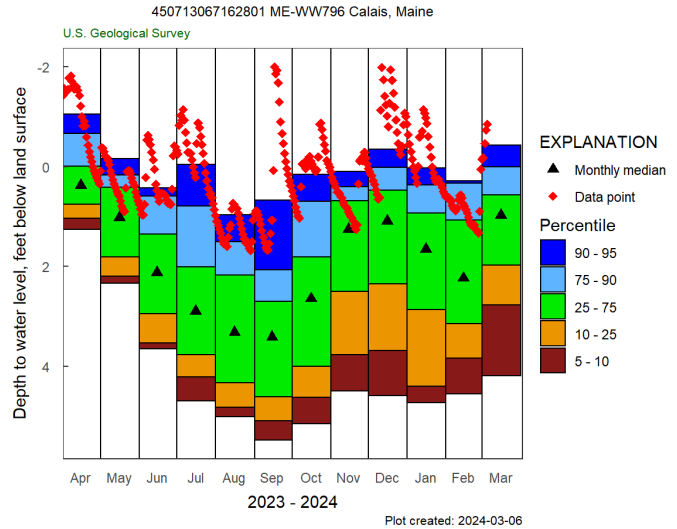
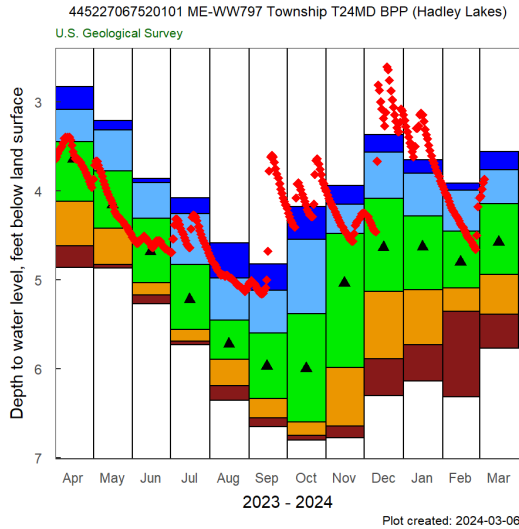


Figure 9-14: Groundwater Level Yearly Plots to Current  
Source: [United States Geological Survey](https://www.usgs.gov/)

Flow or Water Level	Percentile Range	Explanation
Ice Impacted	NA	Ice impacted resulting in No Data available
Low	0 <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.

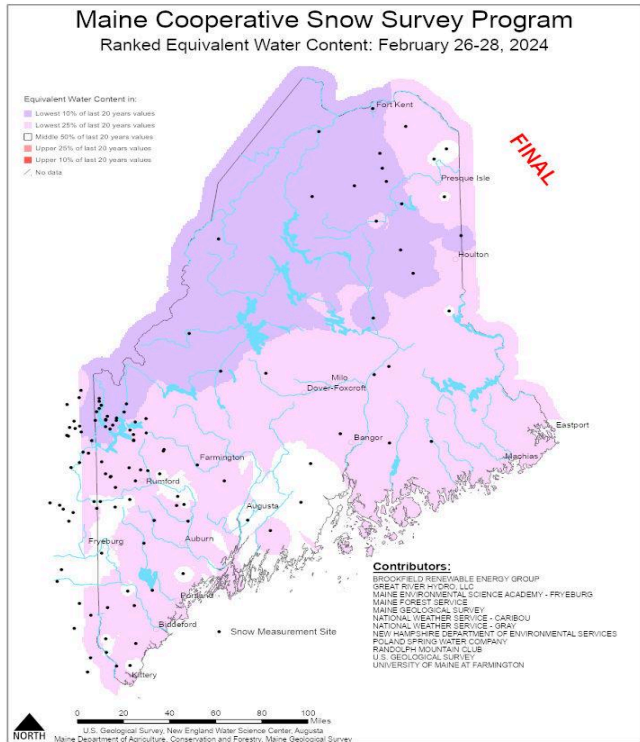
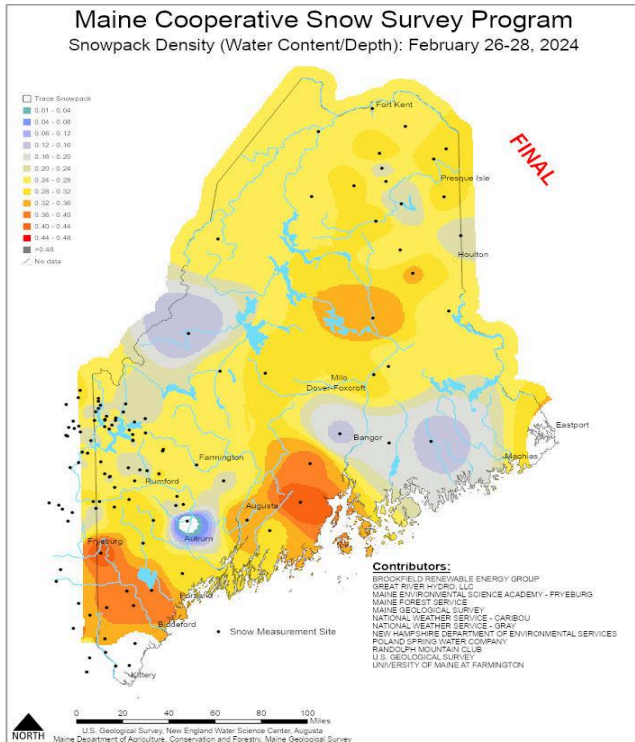
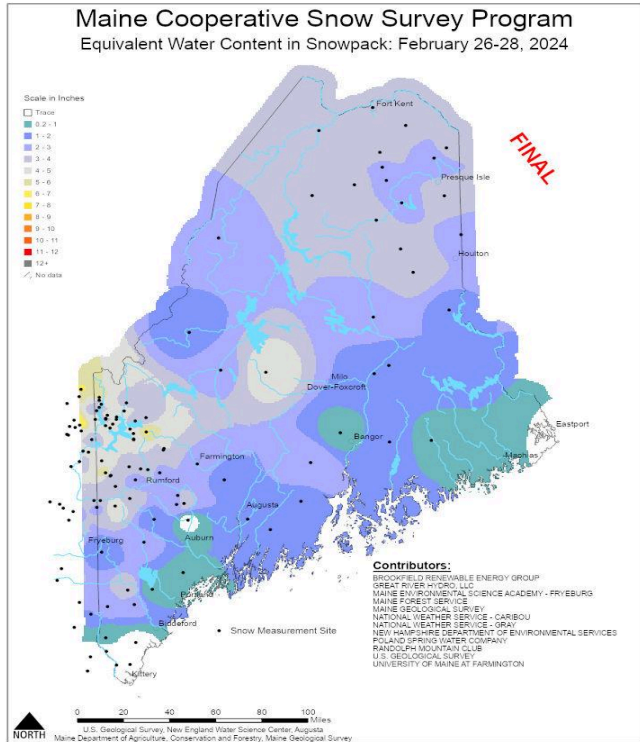
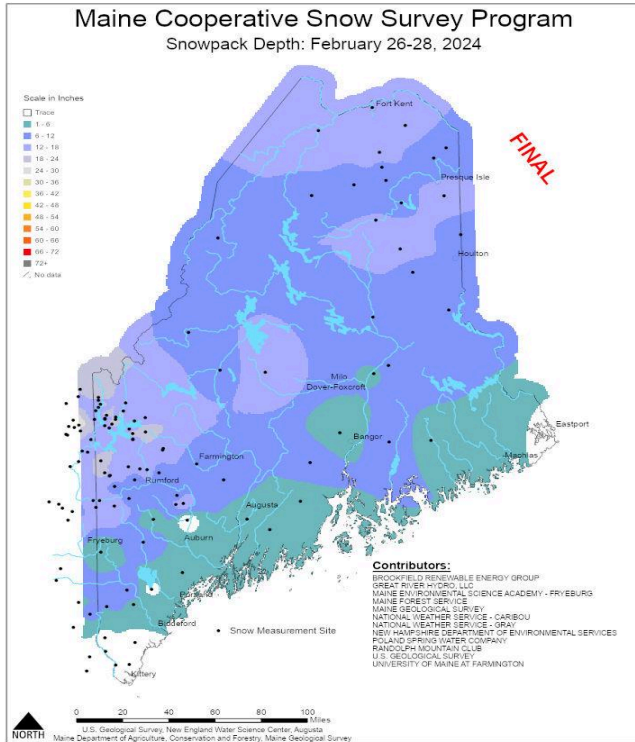
### Non-Routine Hydrologic Products from WFO Caribou, ME February 2024

Product	How Many Issued	Reason for Issuance
Flood Watch	1	Rain on Snow, Ice Jam Potential

# Maine Cooperative Snow Survey Program Comparison

## February 28, 2024 Report

### Snowpack Depth, SWE, Density, SWE Ranking





**General River Ice Pictures for February 2024**

February 26th, Fort Fairfield, Route 1A Bridge



February 28th, Washburn, Castle Hill Road Bridge Looking Upstream





February 27th, Caribou, Above Caribou Dam, Looking Downstream



February 27th, Caribou, Above Caribou Dam





February 26th, Caribou, Above Little Madawaska River Confluence w/ Aroostook



February 26th, Caribou, Above Little Madawaska River, Looking Upstream on Aroostook River





February 26th, Caribou, Above Little Madawaska River, Looking Downstream to Fort Fairfield

