

<b>NWS Form E-5</b> (04-2006) (PRES. BY NWS Instruction 10-924)		<b>U.S. DEPARTMENT OF COMMERCE</b> <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>October                      2024</b>	
				SIGNATURE  <b>James Sinko - Meteorologist</b> <b>Hydrology Program Manager</b>	
TO: Hydrologic Information Center, W/OS31 NOAA's National Weather Service 1325 East West Highway Silver Spring, MD 20910-3283				DATE  <b>November 8, 2024</b>	

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 2024

October 2024 was yet another significantly dry month with drought conditions present with above normal temperatures across Northern and Eastern Maine. The North Atlantic Oscillation (NAO) monthly mean was -0.38 SD as the Pacific North American Pattern (PNA) was nearly exactly neutral with a monthly mean of +0.04 SD. This resulted in significantly higher heights across much of the United States with the highest centered over the Midwest and generally zonal flow over Maine with just weak dips resulting in progressive weather systems. The El Niño-Southern Oscillation (ENSO) pattern remains ENSO Neutral as the Niño 1+2 SST departures sit at -0.5°C and the Niño 3 region was -0.2°C with Niño 3.4 region at -0.2°C. The mostly west to east zonal flow across Maine aided in the persistent dry conditions as several days we were on the northeast axis of high pressure ridge thanks to weak blocking in the North Atlantic near Newfoundland (-NAO). Occasional cold fronts provided precipitation to the region but given the northwest origins in Canada they were mostly on the drier side.

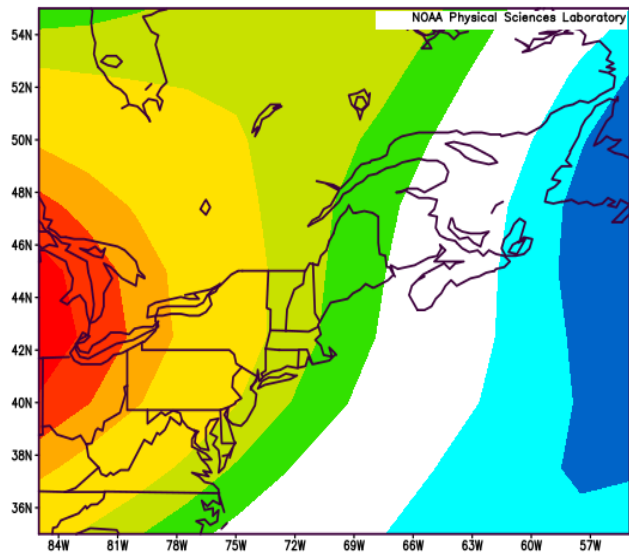


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo)  
October 2024

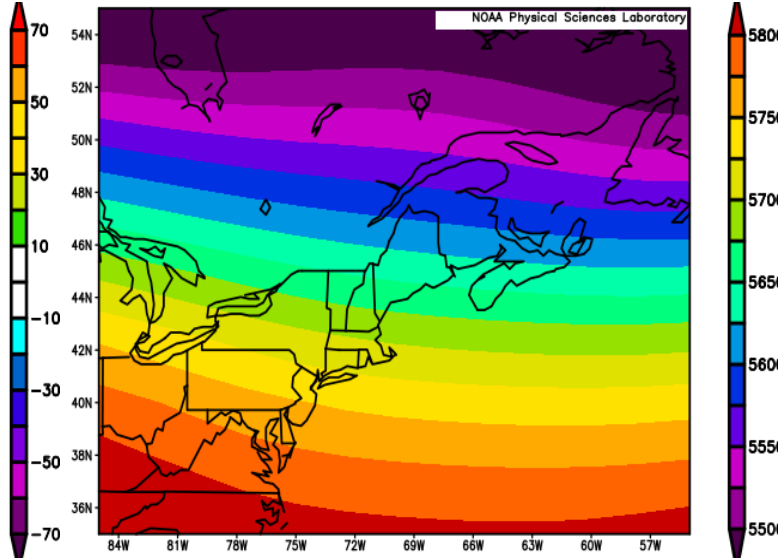


Figure 2: 500mb Geopotential Height (m) Composite Mean  
October 2024

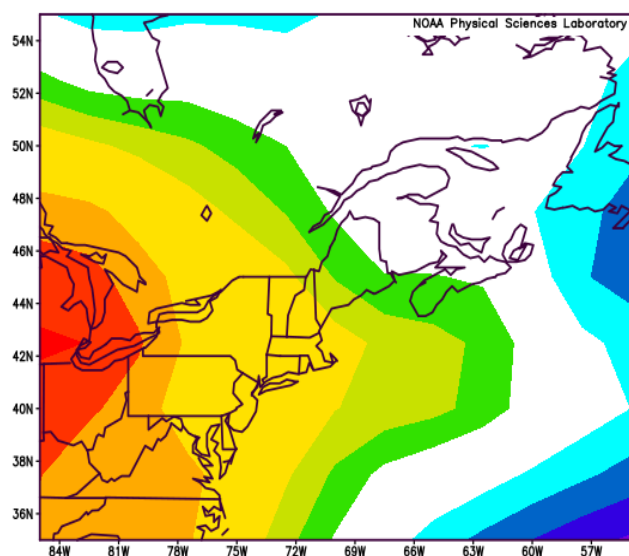


Figure 3: Sea Level Pressure (mb) Anomalies (1991-2020 Climo)  
October 2024

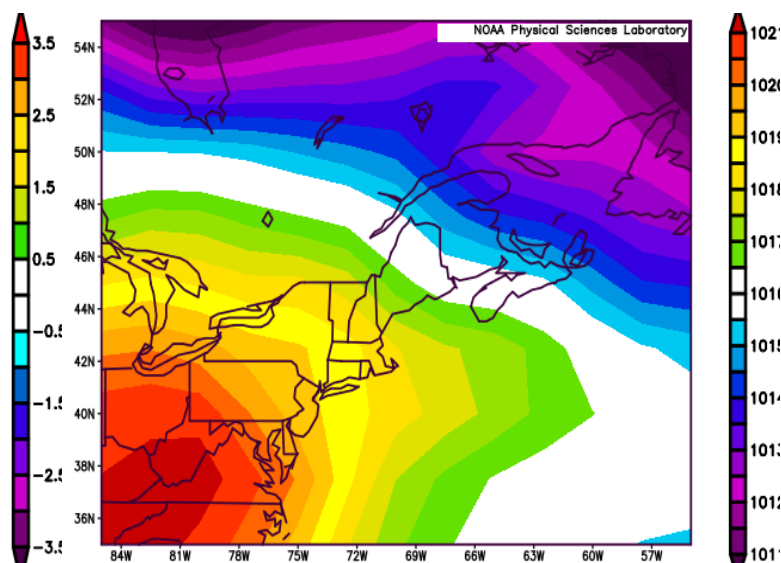


Figure 4: Sea Level Pressure (mb) Composite Mean  
October 2024

Figure 1-4 Source: [NOAA Physical Sciences Laboratory](#)

### Precipitation Totals for Select Locations *(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*	2.89	3.46	-0.57	83.5%					
Fort Kent	3.22	4.26	-1.04	75.6%	0.0	1.1	-1.1	0	0.0
Van Buren	2.38	4.37	-1.99	54.5%	0.0	0.8	-0.8	0	0.0
Caribou	1.48	3.99	-2.51	37.1%	0.1	1.7	-1.6	0	0.0
Houlton	1.65	4.04	-2.39	40.8%					
Millinocket*	1.25	4.55	-3.30	27.5%	0.0			0	0.0
Greenville*	1.59	5.00	-3.41	31.8%					
Moosehead*	1.46	4.45	-2.99	32.8%	0.0	1.2	-1.2	0	0.0
Dover-Foxcroft	1.36	4.82	-3.46	28.2%	0.0	0.5	-0.5	0	0.0
Corinna	1.46	4.77	-3.31	30.6%	0.0	0.3	-0.3	0	0.0
Bangor	1.32	4.58	-3.26	28.8%	0.0	0.6	-0.6	0	0.0
East Surry	2.41	5.06	-2.65	47.6%	0.0	0.0	0.0	0	0.0
Robbinston*	2.63	5.43	-2.80	48.4%	0.0	0.0	0.0	0	0.0
Topsfield*	2.30	5.39	-3.09	42.7%	0.0	1.0	-1.0	0	0.0

\*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. \*Baileyville is a partial complete record to 1917.  
 \*Frenchville ASOS has documented issues with precipitation measurements in the winter months.

**Precipitation** was once again the story across Eastern and Northern Maine with much of the state ranging from only 25-50 percent of normal, marking the second month of widespread significant below normal precipitation. In Caribou, 1.48 inches of rain fell in October which was the 9th driest October on record with records dating back to 1939. In Houlton, 1.65 inches of rain fell which was the 10th driest October on record with records dating back to 1948. Millinocket ended the month with 1.25 inches which was the 7th driest October on record with records dating back to 1903. Bangor finished with 1.32 inches which was the 10th driest on record with records back to 1926. It was the 5th driest October in Robbinston with the site's 29 year period of record. It was the 6th driest October on record for Dover-Foxcroft with the site's 47 year period of record. Corinna finished as the 10th driest October on record with 77 years of record.

Using the 30 day Standardized Precipitation Index (SPI) we see that much of the area was 1.5 to 2 standard deviations below normal indicating severe to extreme dryness.

Monthly **Evaporation** at the National Weather Service Weather Forecast Office in Caribou was 1.81 inches with only 1.43 inches of precipitation. This continued a trend of negative precipitation gains here at the Weather Forecast Office. This was a significant period of dry conditions across the State of Maine for a second straight month. Killer Frost/Freezes occurred in the beginning of the month so the growing season except for grass pretty much ended across the state. Grass was brown in locations that have been struggling for precipitation over the entire month. Evaporation of 1.81 inches was impressive since the Solar Noon sun angle on October 1st was 40° high and then was only 29° above horizon on October 31st. Looking at the **Drought Monitor** reports, we started October with 57.28% of Maine in at least D0 Drought Conditions (Abnormally Dry) with 8.81% in at least D1 Drought (Moderate Drought). Much of the D0-1 conditions were in Eastern/Northern Maine but were expanding westward into the western portions of the state. By the end of the month 90.43% of Maine was in D0 (Abnormally Dry) drought conditions with 33.5% of the state in at least D1 (Moderate Drought) conditions. For reference, traditionally D2 (Severe Drought) isn't introduced unless we are in the growing season with wells running dry or water conservation efforts underway. Drought monitor graphics below.

**Streamflows** continued to be heavily impacted by the lack of excess precipitation across the Hydrological Service Area of Eastern & Northern Maine. Much of the precipitation that was observed was absorbed by the ground and very little ran off into the rivers and streams of Maine. Therefore, all River Basins experienced Below to Much Below Normal discharges for the month and worsened by the end of the month with some observation points observing record low flows. There were only 3 river gages in Eastern/Northern Maine that were at "normal" discharge conditions for the month, those included the St. John River @ Nine Mile Bridge and Dickey Bridge along with the Allagash River above Allagash. 4 gages experienced Below Normal discharges, 7 gages experienced Much Below Normal discharges with 4 gages at Record Low flows for October. Water retention behind Ripogenus Dam has fallen to 15 billion cubic feet which for late October is in the "dry range" indicating the decreasing amount of water storage available. The Penobscot water storage as a whole finished the month at 51.2% full which was 5.8% below the long term average. The total storage in the Union River has fallen to just 26.5% full which is 16.1% below the long term average. Storages across the state are much below normal conditions and typically fall in the driest time of year so this is a statement of the dry conditions. See the table below for more details...

**Groundwater** conditions got worse throughout the month at all observing sites in Eastern and Northern Maine with an exception of the St. John Valley. The Groundwater observations at Fort Kent were in "normal" conditions thanks to excessive storage from the early summer. The Clayton Lake observation site started the month in the 10th percentile which is Below Normal and did recover briefly to Normal conditions mid month before falling back to the 18th percentile and Below Normal again. Millinocket observation started around the 10th percentile at

Below Normal conditions and ended the month at Record Low levels for late October. The Kenduskeag observation site was normal to start the month and finished at the bottom of the “normal” category at the 25th percentile indicative of significant drying of the ground. Hadley Lakes observation in Washington County started October in the 30th percentile which is Normal but fell to the 20th percentile which was Below Normal by late month. Another location that kept in the “Normal” category was the Calais observation site thanks to once again significant surpluses in the summer months but water levels were falling by late month even at this site. Groundwater graphics for the observation sites in Eastern & Northern Maine are below...

**Soil Moisture** conditions at the end of the month using Regression Kriging Interpolation in the top 2 inches finished the month in the 20-30th percentile (dry) across the St. John and much of the Aroostook River basin. The rest of Eastern & Northern Maine finished the month in the 10-20th percentile (very dry). The 8 inch depth soil moisture was in the 10-20th percentile (very dry) for nearly all of Eastern and Northern Maine. Lastly, even the deep soil moisture levels (20 inch depth) dropped to the 30th percentile which is the low end of normal conditions.

**Temperatures** across the region ranged from 1.0 to 3.0 degrees above normal over the region with some locations 3-4 degrees above normal. Caribou’s average temperature was 47.6°F which was the 8th warmest October on record with records dating back to 1939. Houlton average temperature was 47°F which was the 12th warmest October on record with records dating back to 1948.

<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>	46.3	43.8	<b>2.5</b>
<b>Fort Kent</b>	44.4	41.8	<b>2.6</b>
<b>Van Buren</b>	45.6	42.9	<b>2.7</b>
<b>Caribou</b>	47.6	44.5	<b>3.1</b>
<b>Houlton</b>	47.0	44.3	<b>2.7</b>
<b>Millinocket</b>	49.2	46.0	<b>3.2</b>
<b>Greenville*</b>	48.5	44.9	<b>3.6</b>
<b>Moosehead</b>	46.3	43.8	<b>2.5</b>
<b>Dover-Foxcroft</b>	48.5	45.7	<b>2.8</b>
<b>Corinna</b>	49.0	47.9	<b>1.1</b>
<b>Bangor</b>	50.0	48.2	<b>1.8</b>
<b>East Surry</b>	49.1	47.7	<b>1.4</b>
<b>Robbinston*</b>	49.7	48.0	<b>1.7</b>
<b>Topsfield*</b>	48.6	46.4	<b>2.2</b>

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

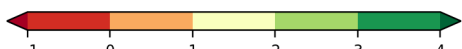
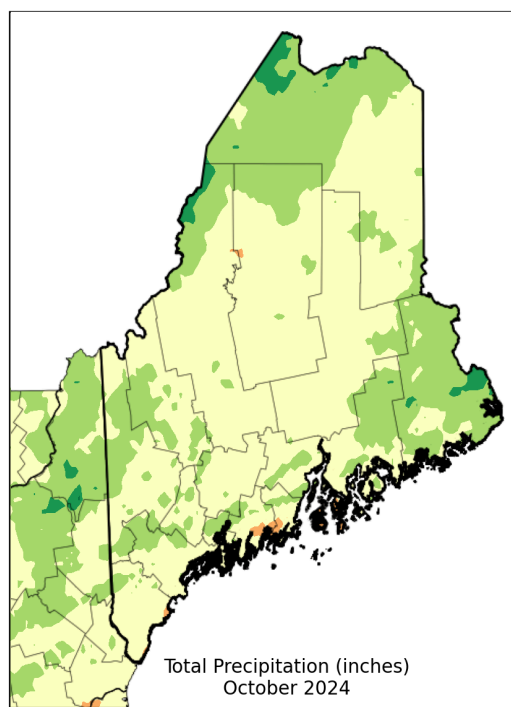


Figure 5. Total Precipitation (inches) October 2024

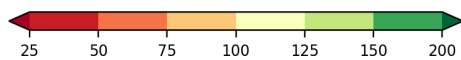
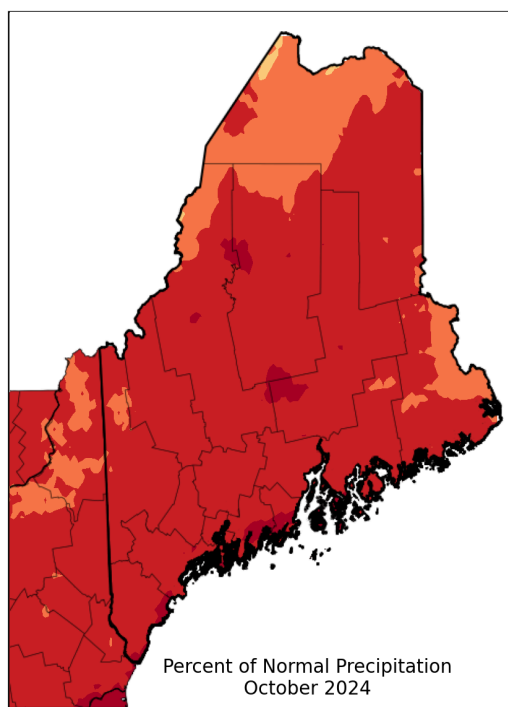


Figure 6. % of Normal Precipitation October 2024

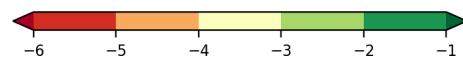
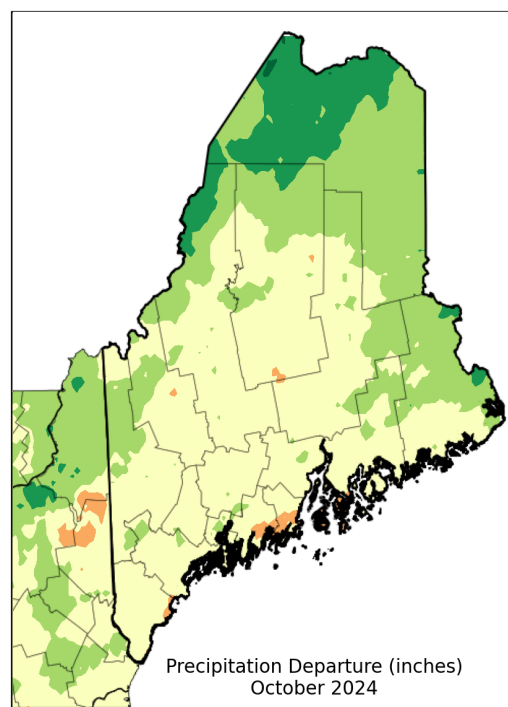


Figure 7. Precipitation Departure (inches) October 2024

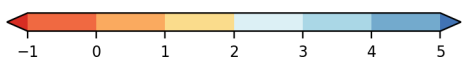
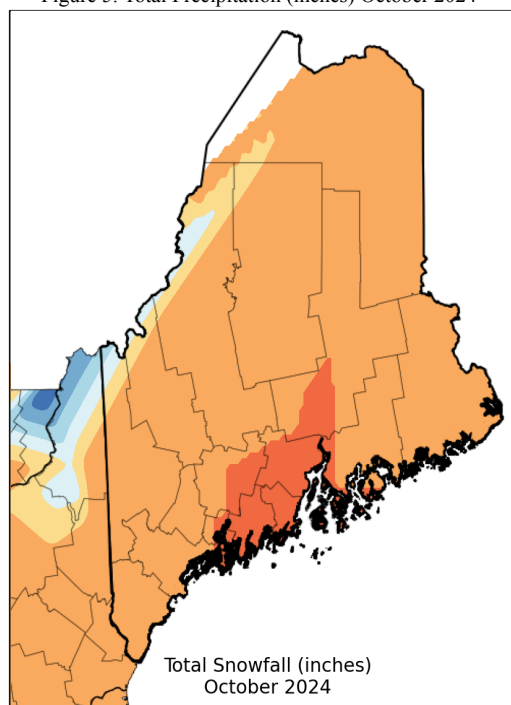


Figure 8. Total Snowfall October 2024



Figure 9. Snowfall Departure October 2024  
Figure 5-10 Source: [Northeast Regional Climate Center](#)

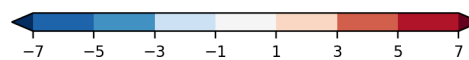
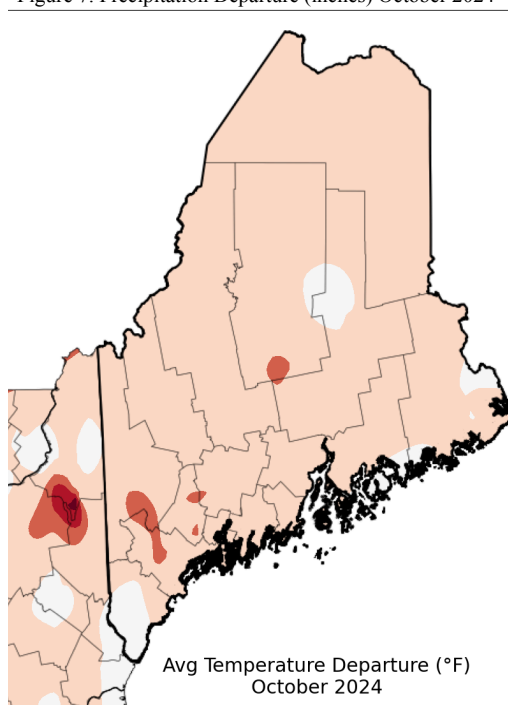


Figure 10. Avg Temperature Departure October 2024

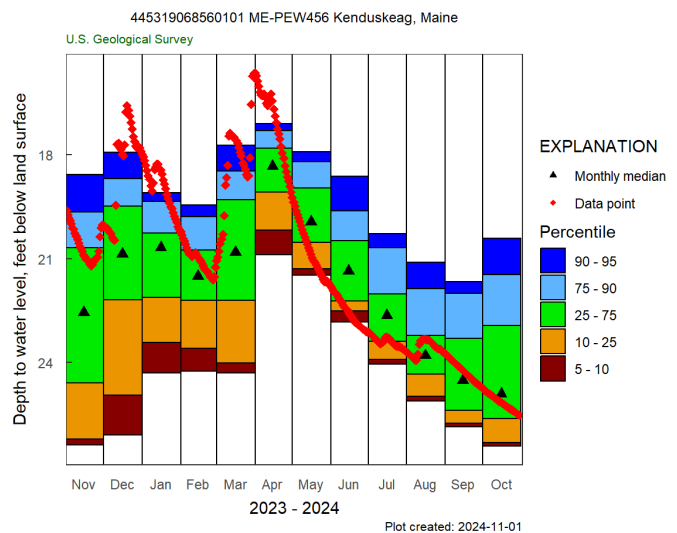
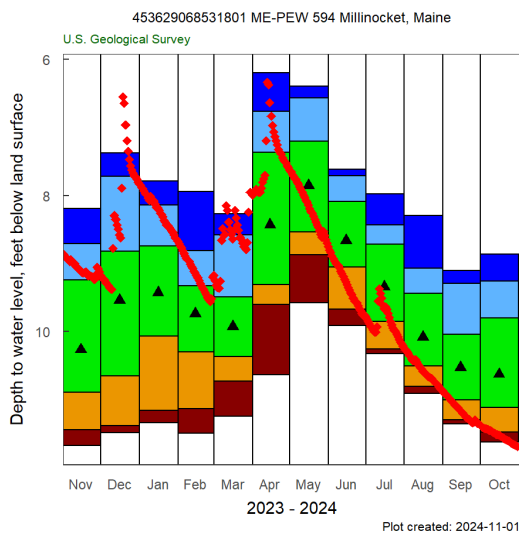
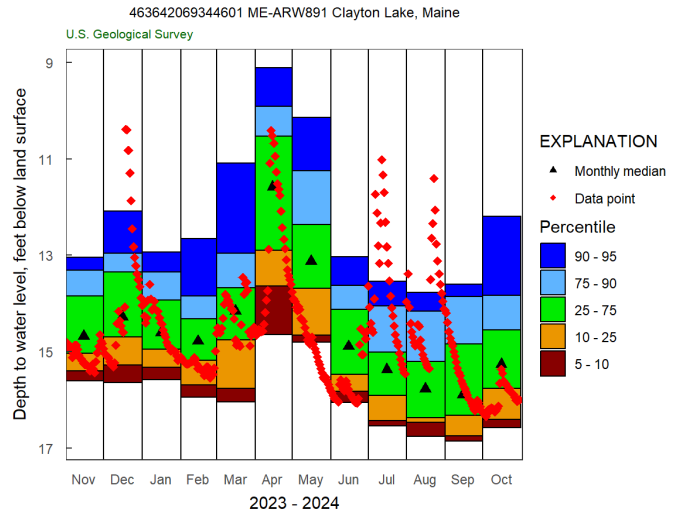
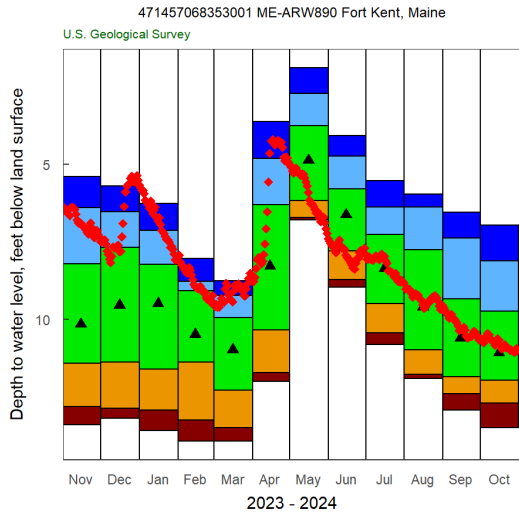
### October Average Monthly Streamflows

\*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	137	47%	Below Normal	171	41
St. John River at Nine Mile Bridge	1262	59%	Normal	1341	74
Allagash River near Allagash	651	48%	Normal	1478	95
St. John River at Dickey	2236	59%	Normal	2680	80
St. John River at Fort Kent	1922	28%	Much Below Normal	5929	98
Fish River near Fort Kent	139	17%	Much Below Normal	873	95
Aroostook River near Masardis	184	16%	Low	892	67
Aroostook River at Washburn	419	22%	Much Below Normal	1654	94
St. Croix River at Vanceboro	183	30%	Much Below Normal	413	95
St. Croix River at Baring	423	21%	Low	1374	65
Grand Lake Stream at Grand Lake Stream	71	21%	Low	228.3	94
Narraguagus River at Cherryfield	52	17%	Much Below Normal	227	75
East Branch Penobscot River at Grindstone	504	36%	Below Normal	837	102
Mattawamkeag near Mattawamkeag	124	8%	Low	1418	90
Piscataquis River near Dover-Foxcroft	72	16%	Below Normal	298	122
Sebec River at Sebec	171	41%	Below Normal	326	68
Piscataquis River at Medford	427	23%	Much Below Normal	1162	93
Penobscot River at West Enfield	3865	42%	Much Below Normal	6422	122

## October Monthly Average Groundwater Levels

Station	Percentile Class	Years of Record
Hadley Lakes	Normal	39
Kenduskeag	Normal	44
Calais	Normal	43
Millinocket	Much Below Normal	30
Clayton Lake	Below Normal	35
Fort Kent	Normal	48



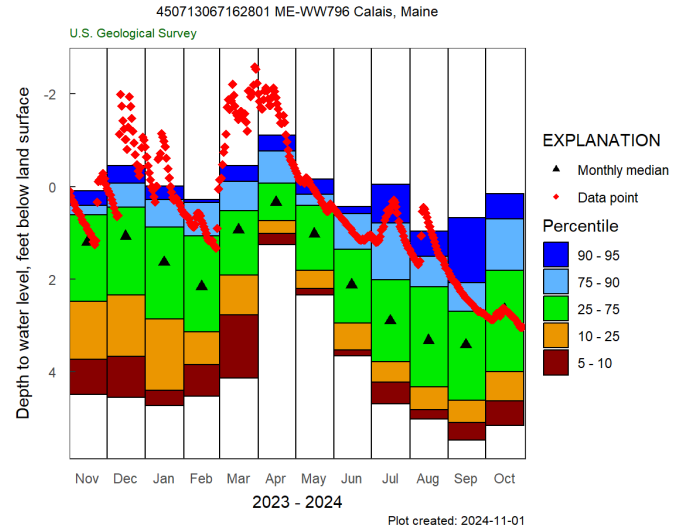
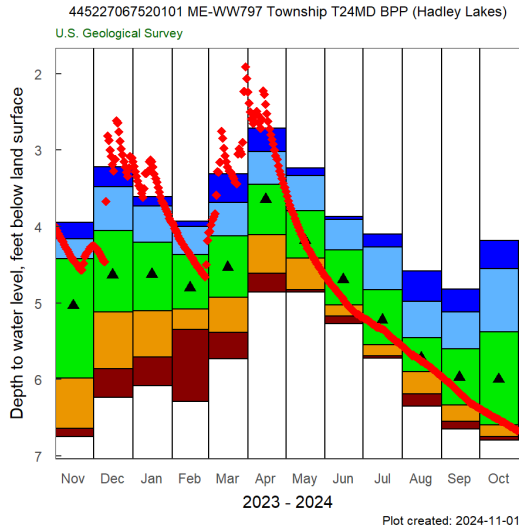


Figure 11-16: Groundwater Level Yearly Plots to Current  
Source: [United States Geological Survey](https://www.usgs.gov/)

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  
October 2024**

None issued.

**CoCoRaHS Complete Precipitation Reports  
[www.cocorahs.org](http://www.cocorahs.org)  
October 2024**

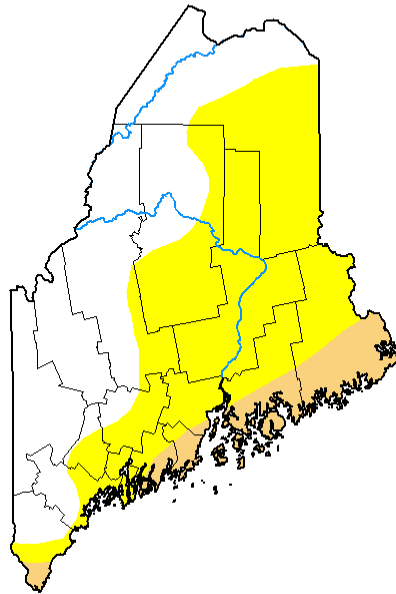
<b>Station Number</b>	<b>Station Name/Location</b>	<b>Total Precipitation (inches)</b>	<b>Total Snowfall (inches)</b>
ME-AR-15	Presque Isle 1.3 WSW	1.41	0.1
ME-AR-18	New Sweden 4.9 NNW	2.23	0.7
ME-AR-28	Presque Isle 4.2 S	1.34	0.0
ME-AR-41	Castle Hill 1.0 S	1.78	Trace
ME-AR-42	Houlton 2.5 NNW	1.46	0.0
ME-HN-2	East Surry	2.41	0.0
ME-HN-42	Bucksport 3.3 NNW	1.65	0.0
ME-HN-56	Surry 2.5 SSE	2.35	0.0
ME-HN-58	Sullivan 2.4 SSE	1.61	0.0
ME-PN-55	Orono 1.1 SSW	1.73	0.0
ME-PN-58	Hudson 2.4 ESE	1.26	0.0
ME-PS-9	Abbot 4.6 WNW	1.80	0.0
ME-WS-31	Eastport 1.4 ESE	2.68	0.0
ME-WS-34	Perry 3.8 NNW	3.31	0.0

**\*Additional CoCoRaHS reports were not complete with 31 days of record**

## Drought Monitor October 1, 2024

### U.S. Drought Monitor Maine

**October 1, 2024**  
(Released Thursday, Oct. 3, 2024)  
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 Tinker  
CPC/NOAA/NWS/NCEP

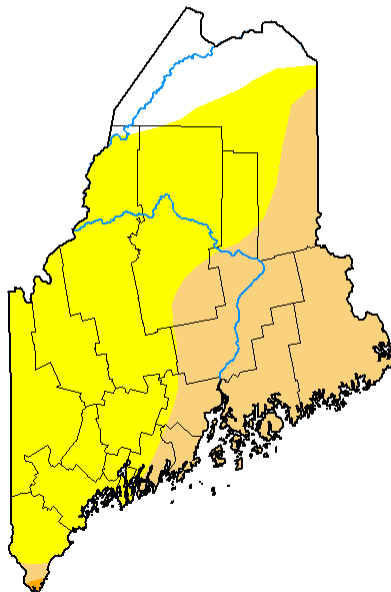


[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

## Drought Monitor October 29, 2024

### U.S. Drought Monitor Maine

**October 29, 2024**  
(Released Thursday, Oct. 31, 2024)  
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>*

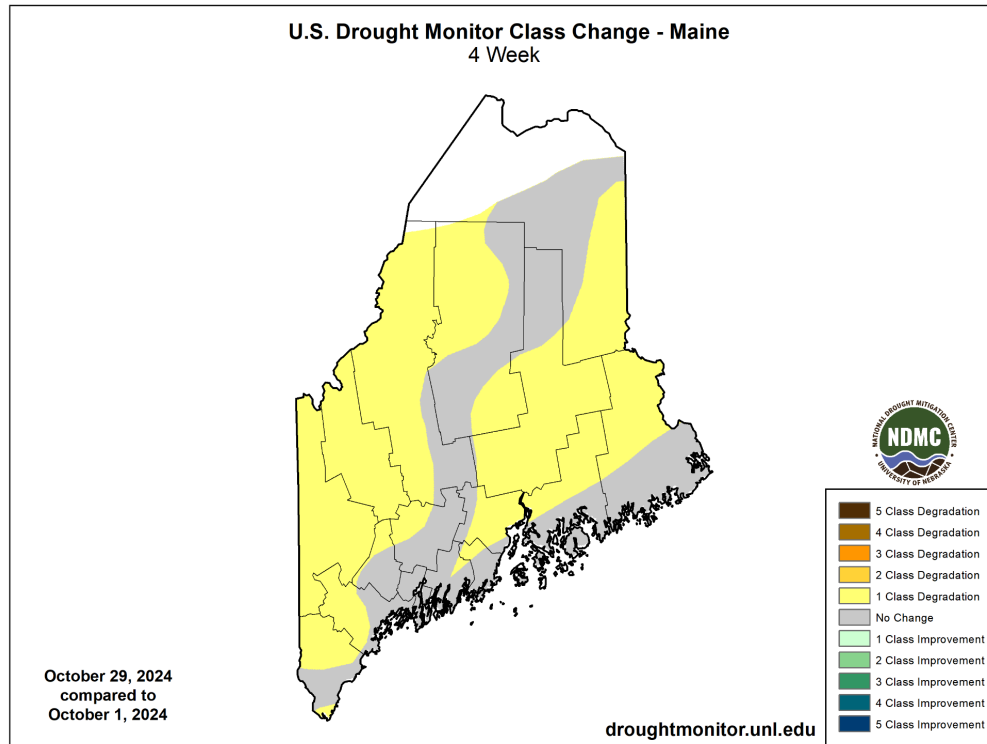
#### Author:

Brian Fuchs  
National Drought Mitigation Center



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

## Drought Monitor Change in October 2024



Week	None (%)	D0-D4 (%)	D1-D4 (%)	D2-D4 (%)	D3-D4 (%)	D4 (%)	DSCI
10/1/2024	42.72	57.28	8.81	0.00	0.00	0.00	66
10/29/2024	9.57	90.43	33.50	0.14	0.00	0.00	124
Change	-33.15	33.15	24.69	0.14	0.00	0.00	58

## October 2-31, 2024 30 Day Standardized Precipitation Index (SPI) Blend



The Standardized Precipitation Index (SPI) is a widely used index to characterize meteorological drought on a range of timescales. On short timescales, the SPI is closely related to soil moisture, while at longer timescales, the SPI can be related to groundwater and reservoir storage. The SPI Blend is a modified version of the Standardized Precipitation Index (SPI) that uses precipitation data from multiple time scales to assess drought. It was created for use in a high-resolution drought monitoring tool. *Note the “Exceptional Dryness” along the Midcoast and Downeast Hancock County coast is slightly overdone due to limitations in resolution with the island observations versus the Gulf of Maine waters.*

