NWS Form E-5 (04-2006) (PRES. BY NWS Instruction 10-924) **U.S. DEPARTMENT OF COMMERCE** **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION** **NATIONAL WEATHER SERVICE**	HYDROLOGIC SERVICE AREA (HSA) **WFO Caribou, Maine**
MONTHLY REPORT OF HYDROLOGIC CONDITIONS	REPORT FOR: MONTH YEAR **November 2024**
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 **December 4, 2024**

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.

November 2024

November 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 -0.13 SD as the Pacific North American Pattern (PNA) was nearly exactly neutral with a monthly mean of +0.03 SD. The beginning of the month featured a significantly progressive pattern which resulted in very little precipitation. Later in the month the NAO blocking pattern became very strong which slowed the pattern and turned things colder, a stagnant pattern and we began to see more precipitation by later in the month. Overall, this resulted in the mean trough location to our east with more ridging back to the west over the Great Lakes.

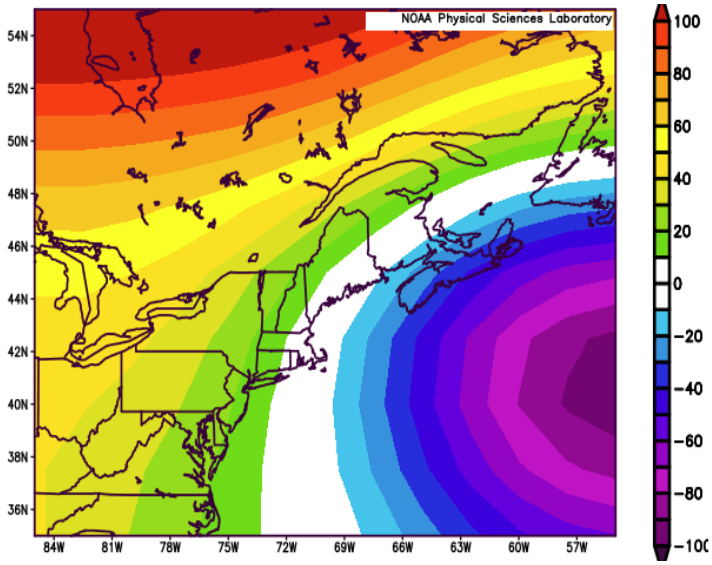


Figure 1: 500mb Geopotential Height (m) Anomalies *(1991-2020 Climo)* November 2024

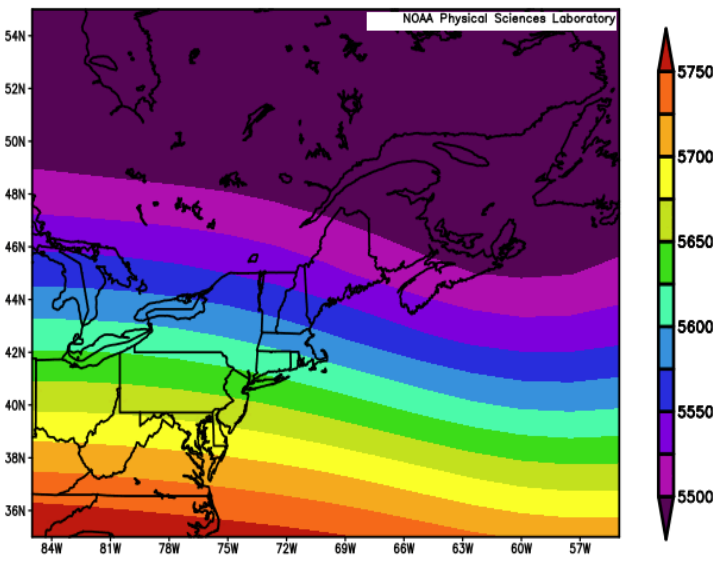


Figure 2: 500mb Geopotential Height (m) Composite Mean November 2024

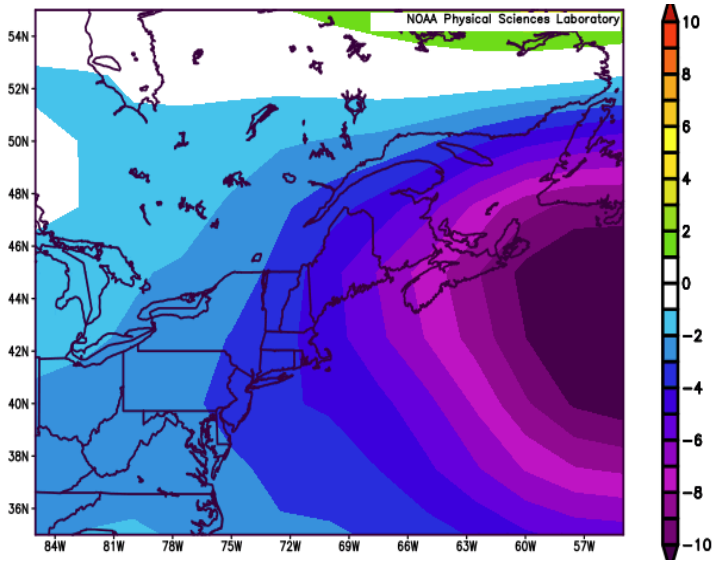


Figure 3: Sea Level Pressure (mb) Anomalies *(1991-2020 Climo)*
November 2024

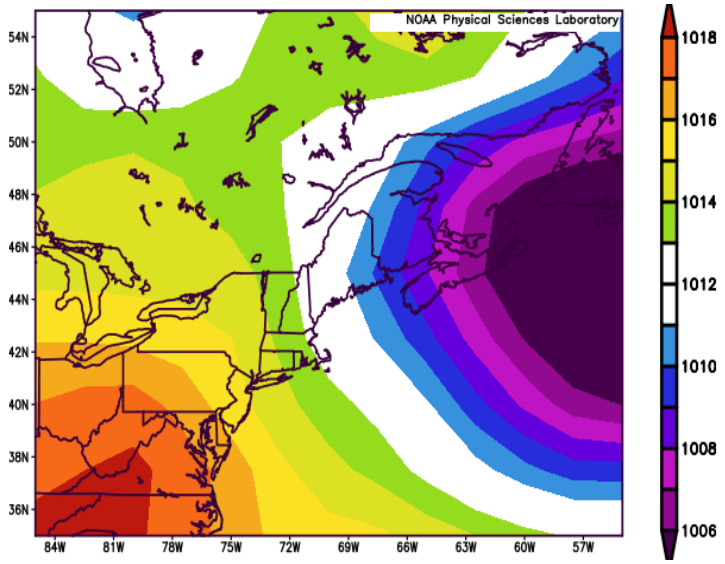


Figure 4: Sea Level Pressure (mb) Composite Mean
November 2024

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*	1.35	2.58	**-1.23**	52.3%					
Fort Kent	2.92	3.23	**-0.31**	90.4%	3.0	8.9	**-5.9**	4	0.3
Van Buren	2.15	3.37	**-1.22**	63.8%	4.0	7.4	**-3.4**	4	0.3
Caribou	2.43	3.35	**-0.92**	72.5%	6.5	10.4	**-3.9**	5	0.3
Houlton	3.31	3.61	**-0.30**	91.7%					
Millinocket*	1.96	4.10	**-2.14**	47.8%	7.0			6	0.4
Greenville*	2.21	3.96	**-1.75**	55.8%					
Moosehead*	2.45	3.42	**-0.97**	71.6%	5.0	6.5	**-1.5**	4	0.2
Dover-Foxcroft	2.65	4.09	**-1.44**	64.8%	7.5	3.9	**3.6**	7	0.5
Corinna	2.09	4.11	**-2.02**	50.9%	4.0	4.1	**-0.1**	4	0.3
Bangor	2.42	3.84	**-1.42**	63.0%	2.8	4.3	**-1.5**	3	0.2
East Surry	2.09	4.11	**-2.02**	50.9%	4.0	4.1	**-0.1**	4	0.3
Robbinston*	1.95	5.50	**-3.55**	35.5%	0.2	3.6	**-3.4**		
Topsfield*	2.94	5.29	**-2.35**	55.6%	5.0	8.4	**-3.4**	4	0.2

**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 ranged from 50-90% of normal with much of the precipitation falling during the last third of the month. This was the 3rd month in a row with significant precipitation deficits across all of Eastern and Northern Maine. Snowfall was mostly below average, but was a bit above average in portions of Southern Piscataquis County and Southern Aroostook County. The most significant event of the month was a snowstorm on the 28th into the 29th that produced as much as 15 inches of snow at Parkman in Piscataquis County, and 13 inches at Hammond in Aroostook county. Elsewhere, across the region, amounts mostly ranged from 3 to 8 inches. There were some areas along the coast where snowfall was an inch or less. Temperatures during the storm were very close to freezing leading to very heavy snowfall quality which resulted in slick travel, numerous accidents and significant power outages from tree damage. Using the 30 day Standardized Precipitation Index (SPI) we see that much of the area was 1 to 1.5 standard deviations below normal indicating severe to extreme dryness. There was an area from Moosehead Lake region north into NW Piscataquis County that was 1.6 to 2 standard deviations below normal. The "best" area was in Eastern Aroostook County from Island Falls to Houlton north to Mars Hill and south to Danforth where it was only 0.5 to 0.7 standard deviation below normal indicating Abnormal Dryness. In terms of snow depth there was no snow on the ground at the start of the month. By the end of the month, the snow depth ranged from 4 to 10 inches across far Northern Maine with 2 inches in Bangor and little to no snow along the immediate coastline and islands.

Looking at the **Drought Monitor** we saw no changes from the start of the month till the end since wintry precipitation had begun, precipitation remained in deficits and frost began forming by late month. Moderate Drought (D1) included 70.73% of the State of Maine with the rest of the state in Abnormally Dry (D0) conditions. Although precipitation deficits continued 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 precipitation across the Hydrological Service Area of Eastern & Northern Maine. 3 straight months of significant deficits has resulted in near record level low flows at a couple gages. At Masardis on the Aroostook River the monthly mean discharge was 248.48cfs with the previous record monthly mean low for November is 292.1cfs set in 2001. The period of record for the Aroostook River at Masardis dates back 67 years to September 1957. The Mattawamkeag River near Mattawamkeag the monthly mean discharge was 199.23cfs with the previous record monthly mean low for November at 255.7cfs set in 2001. The period of record for the Mattawamkeag River near Mattawamkeag dates back 89 years to October 1934. 12 other gages with statistics in our service area were "Much Below Normal" which is less than 10th percentile. The last 4 gages with climatological statistics were "Below Normal" which is the 10-24th percentile. Overall, everywhere in the service area was "Below Normal" flows which indicates conditions worsened from October. See the table below for more details. In terms of **River Ice**… Light frazil ice and pancake ice developed on the St. John and Aroostook River's mid month for one morning thanks to 2 days of cold weather and the low turbulent flow. Ice wasn't present again till the end of the month when the northern rivers including the Aroostook, St. John and Meduxnekeag were able to generate frazil ice again.

Groundwater conditions continue to worsen at all sites except Calais where there were improvements in the month of November. The Fort Kent site remained on the very low end of the "Normal" category for the month. Calais was mid range "Below Normal" conditions and improved to nearly "Normal" conditions for the end of the month but will average "Below Normal". Clayton Lake remained near record low levels but ended up averaging "Much Below Normal" for the month. Elsewhere in the Central Highlands and Downeast remained "Below Normal" to "Much Below Normal" conditions with little improvement. By the end of the month with snowpack on the ground and the generation of 1 inch of frost in some spots the absorption rates have ended. 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 30-70th percentile

(normal) across much of the Aroostook, Mattawamkeag, Piscataquis and Penobscot River Basin's. Across the North Woods conditions varied from the 20-30th percentile (dry) to 2-5th percentile (extremely dry) in the upper St. John River Basin. The 8 inch depth soil moisture was in the 2nd-20th percentile (extreme to very dry) for nearly all of the North Woods from Moosehead Region to Estcourt Station with the worst in the Big Black River catch basin. Elsewhere, thanks to precipitation there were improvements for the Central Highlands, Eastern Aroostook and Downeast coast which returned to normal to above normal moisture conditions. Lastly, the deep soil moisture levels (20 inch depth) dropped to the 10th-25th percentile which is below normal (dry) for the upper St. John River basin. Elsewhere, across the North from Moosehead to NE Aroostook returned to near normal conditions. Central Highlands to the Downeast coast become very wet by the end of the month thanks to rainfall plus snowmelt but this is likely because absorption occurred when climatologically speaking absorption is shut off at this point because of frost.

Temperatures most of the month were mild. There was only one night all month in Caribou and Bangor when lows dropped into the teens. Only 1948, 2009 and 2016 had fewer nights (none) with a low in the teens in Caribou. Record high temperatures were observed across the region on the 6th with widespread highs in the 70s. In Caribou, the high of 72°F was the 2nd warmest high temperature so late in the season. In Bangor, the high of 75°F tied with 1938 for the warmest temperature ever observed so late in the season. In Caribou, it was the warmest November on record, besting 2011 by 0.3°F. Six of the top 10 warmest Novembers have been observed since 2006. In Bangor, it tied with 1934 and 2016 as the 4th warmest November on record. It was also the 4th warmest November on record in Millinocket and a tie with 1953 for the 6th warmest in Houlton.

Town/City	Avg Monthly Temperature (°F)	Normal Monthly Temperature (°F)	Departure from Normal (°F)
Frenchville	36.0	31.8	**4.2**
Fort Kent	35.6	30.3	**5.3**
Van Buren	36.8	31.2	**5.6**
Caribou	38.2	32.6	**5.6**
Houlton	37.6	33.1	**4.5**
Millinocket	39.0	34.6	**4.4**
Greenville*	36.8	32.9	**3.9**
Moosehead	37.0	32.4	**4.6**
Dover-Foxcroft	39.7	34.4	**5.3**
Corinna	41.9	36.7	**5.2**
Bangor	41.8	37.3	**4.5**
East Surry	41.9	36.7	**5.2**
Robbinston*	40.9	37.7	**3.2**
Topsfield*	38.9	35.0	**3.9**

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

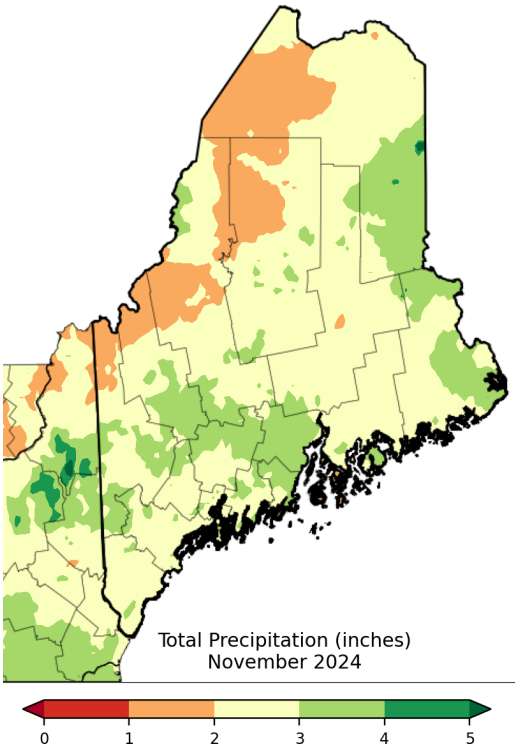


Figure 5. Total Precipitation (inches) November 2024

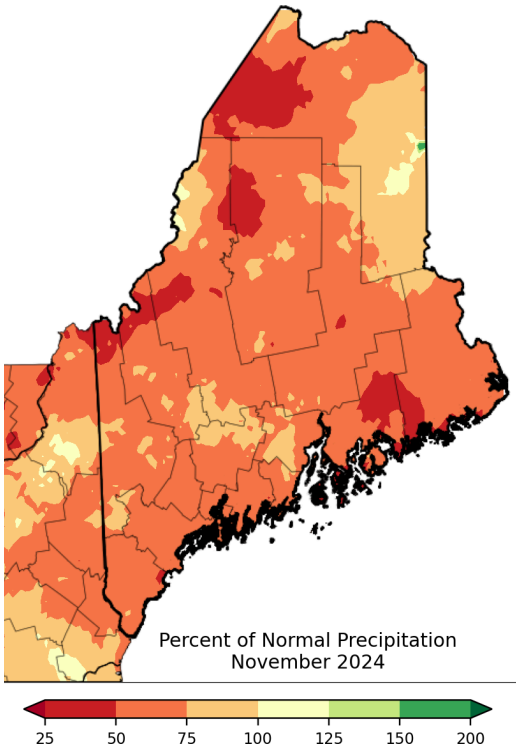


Figure 6. % of Normal Precipitation November 2024

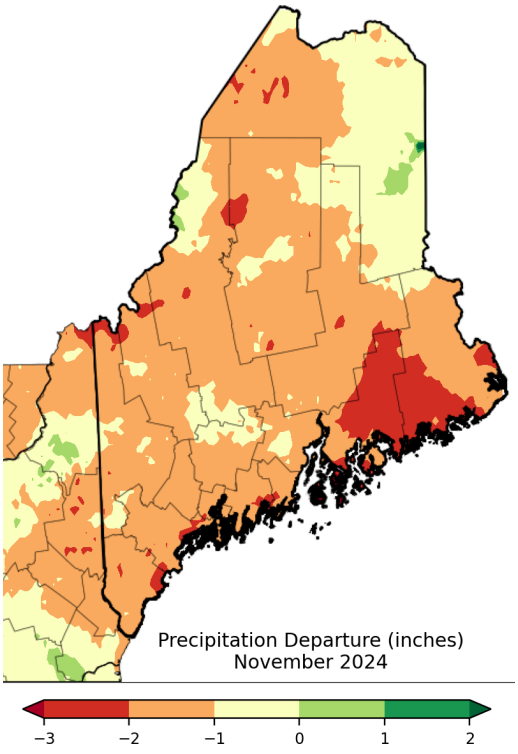


Figure 7. Precipitation Departure (inches) November 2024

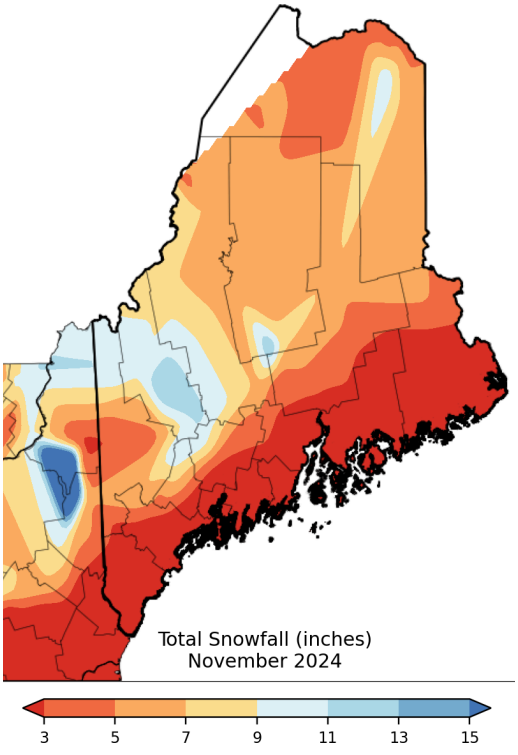


Figure 8. Total Snowfall November 2024

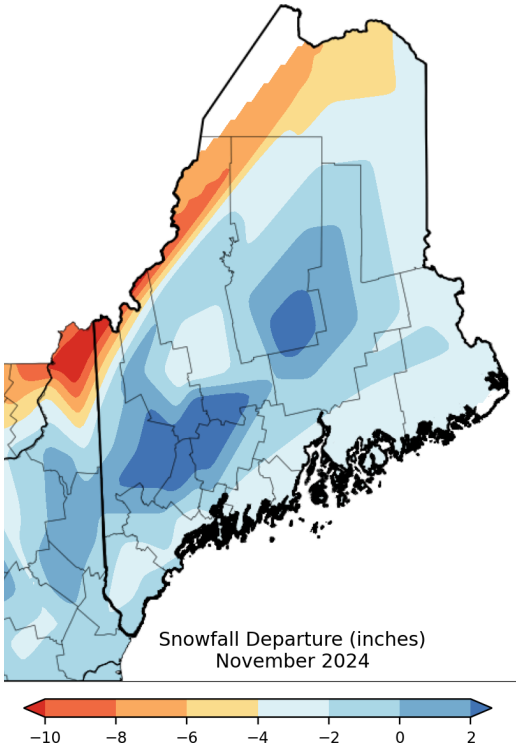


Figure 9. Snowfall Departure November 2024

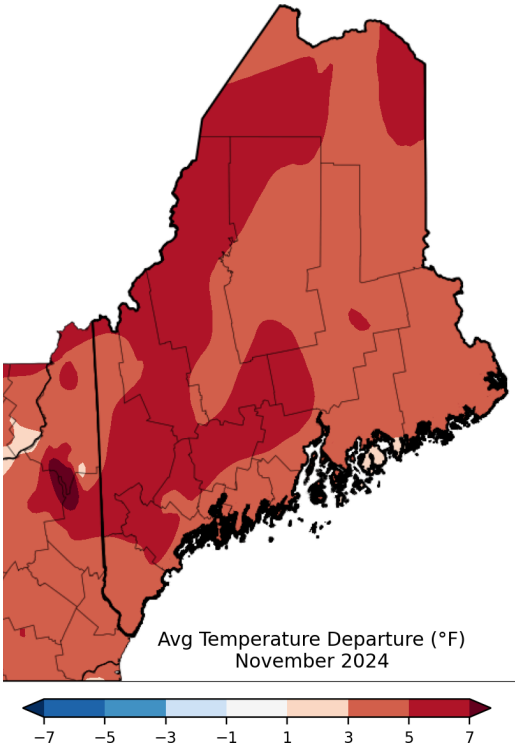


Figure 10. Avg Temperature Departure November 2024

Figure 5-10 Source: Northeast Regional Climate Center

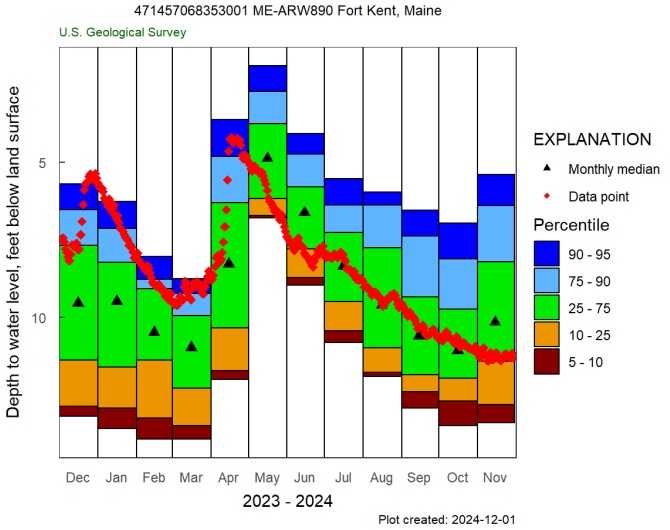
November Average Monthly Streamflows

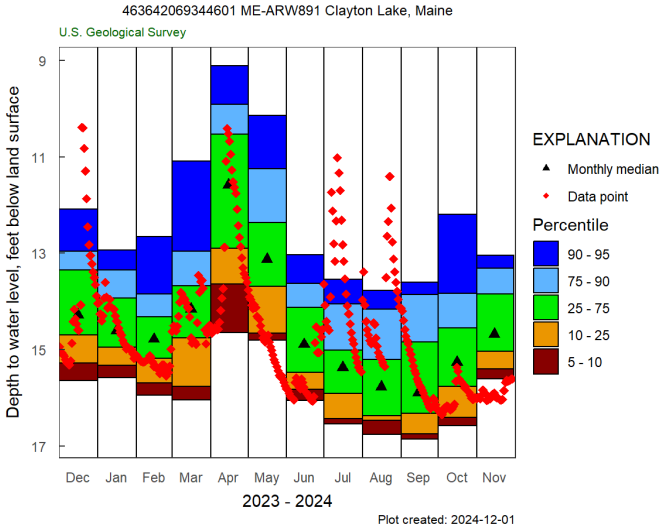
Data provided by the U.S. Geological Survey

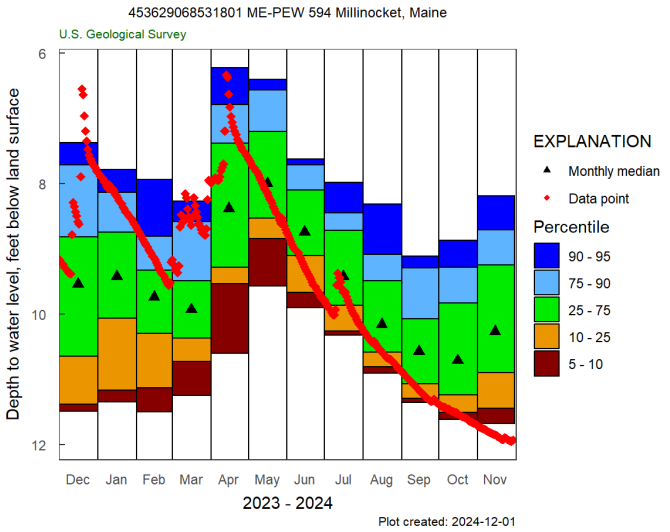
River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi^2)	Years of Record
Big Black River near Depot Mtn	143	43%	Much Below Normal	171	40
St. John River at Nine Mile Bridge	1161	48%	Below Normal	1341	73
Allagash River near Allagash	606	36%	Below Normal	1478	94
St. John River at Dickey	2020	46%	Below Normal	2680	79
St. John River at Fort Kent	1891	21%	Much Below Normal	5929	97
Fish River near Fort Kent	142	11%	Much Below Normal	873	94
Aroostook River near Masardis	248	16%	Low	892	66
Aroostook River at Washburn	509	19%	Much Below Normal	1654	93
St. Croix River at Vanceboro	135	28%	Much Below Normal	413	96
St. Croix River at Baring	391	16%	Much Below Normal	1374	65
Grand Lake Stream at Grand Lake Stream	54	26%	Much Below Normal	228.3	95
Narraguagus River at Cherryfield	66	11%	Much Below Normal	227	75
East Branch Penobscot River at Grindstone	411	22%	Much Below Normal	837	102
Mattawamkeag near Mattawamkeag	199	7%	Low	1418	89
Piscataquis River near Dover-Foxcroft	90	13%	Much Below Normal	298	121
Sebec River at Sebec	248	41%	Below Normal	326	68
Piscataquis River at Medford	530	19%	Much Below Normal	1162	92
Penobscot River at West Enfield	3800	31%	Much Below Normal	6422	121

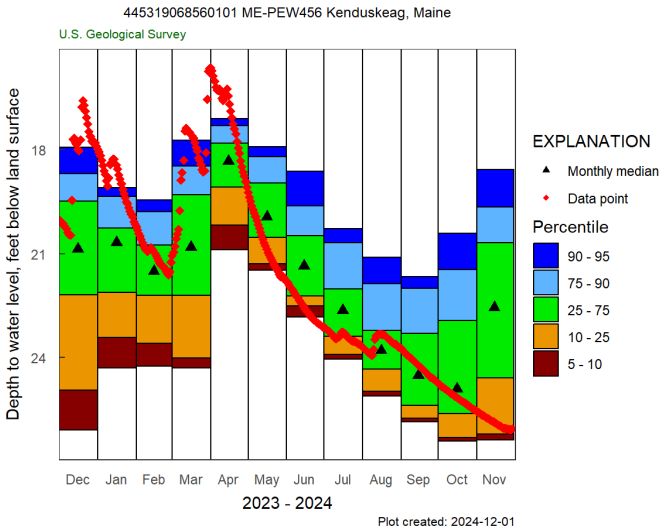
November Monthly Average Groundwater Levels

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









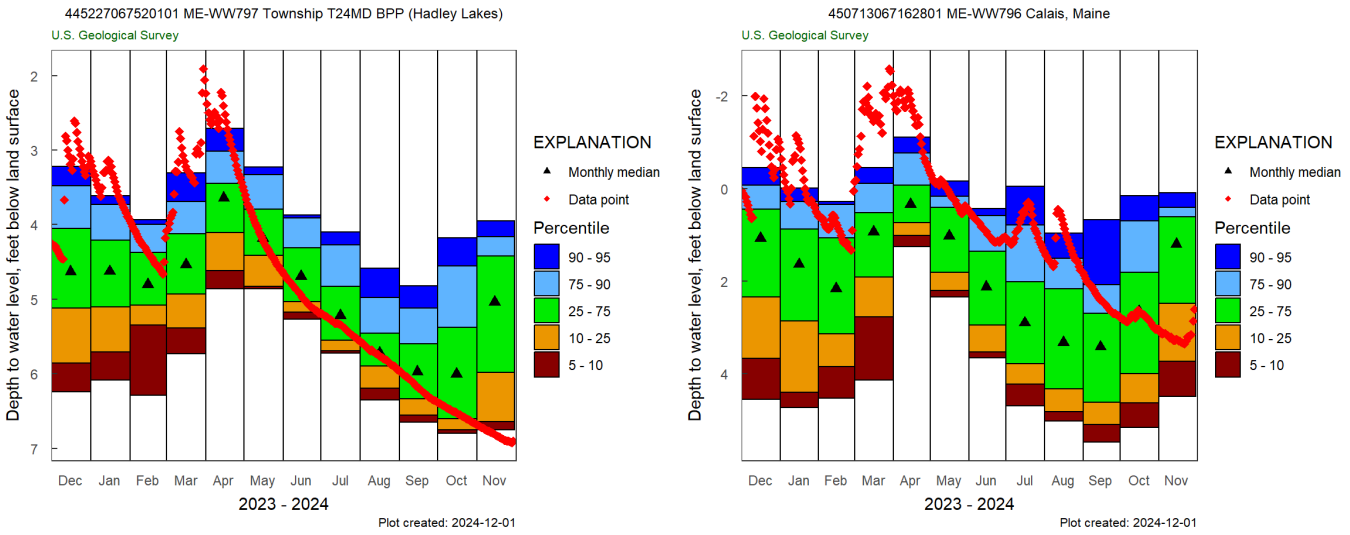


Figure 11-16: Groundwater Level Yearly Plots to Current
Source: United States Geological Survey

Flow or Water Level	Percentile Range	Explanation
Ice Impacted	NA	Ice impacted resulting in No Data available
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 from WFO Caribou, ME
November 2024

None issued.

CoCoRaHS Complete Precipitation Reports
www.cocorahs.org
November 2024

Station Number	Station Name/Location	Total Precipitation (inches)	Total Snowfall (inches)
ME-AR-15	Presque Isle 1.3 WSW	2.67	5.6
ME-AR-18	New Sweden 4.9 NNW	2.49	10.9
ME-AR-41	Castle Hill 1.0 S	3.03	9.9
ME-AR-42	Houlton 2.5 NNW	3.61	8.0
ME-HN-2	East Surry	2.94	1.0
ME-HN-4	Mariaville 1.4 ESE	2.23	0.5
ME-HN-26	Brooklin 2.8 SE	2.03	0.0
ME-HN-42	Bucksport 3.3 NNW	2.76	2.1
ME-PN-55	Orono 1.1 SSW	2.91	4.5
ME-PN-58	Hudson 2.4 ESE	2.37	2.3
ME-WS-31	Eastport 1.4 ESE	3.82	0.0
ME-WS-34	Perry 3.8 NNW	2.19	2.0

***Additional CoCoRaHS reports were not complete with 30 days of record**

Drought Monitor November 5, 2024

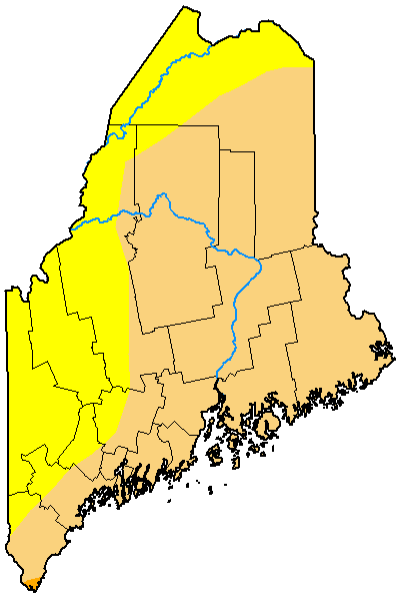
U.S. Drought Monitor

Maine

November 5, 2024

(Released Thursday, Nov. 7, 2024)

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:

Brian Fuchs
National Drought Mitigation Center

droughtmonitor.unl.edu

Drought Monitor November 26, 2024

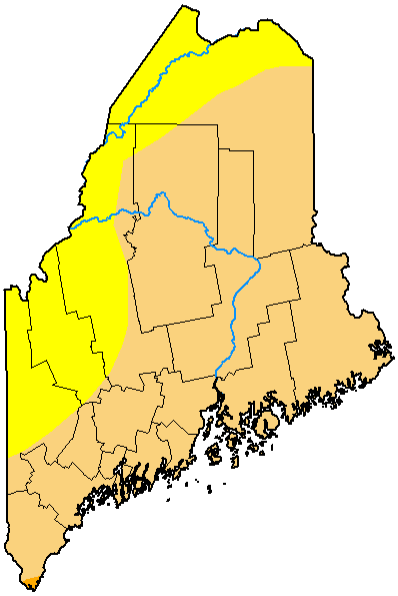
U.S. Drought Monitor

Maine

November 26, 2024

(Released Wednesday, Nov. 27, 2024)

Valid 7 a.m. EST



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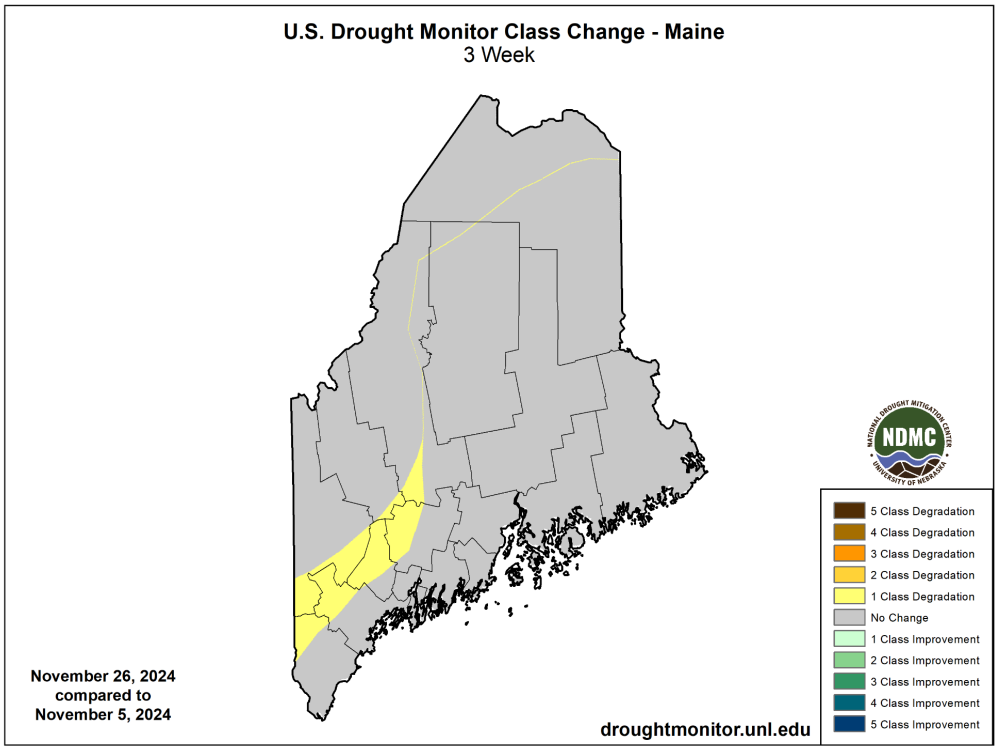
Author:

David Simeral
Western Regional Climate Center

droughtmonitor.unl.edu

Drought Monitor Change in November 2024



Week	None (%)	D0-D4 (%)	D1-D4 (%)	D2-D4 (%)	D3-D4 (%)	D4 (%)	DSCI
11/5/2024	0	100	64.46	0.14	0	0	165
11/26/2025	0	100	70.73	0.14	0	0	171
Change	0	0	6.27	0	0	0	6

November 1-30, 2024 30 Day Standardized Precipitation Index (SPI) Blend

TEXAS A&M UNIVERSITY

Southern Regional Climate Center
Department of Atmospheric Sciences

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.*