

MONTHLY REPORT OF HYDROLOGIC CONDITIONS

WFO Caribou, Maine

REPORT FOR:
MONTH YEAR

January 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

February 5, 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).

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

January 2024

January 2024 featured a return to winter conditions across the area with colder temperatures, snowfall and river ice development. A pattern shift took place in January with the North Atlantic Oscillation (NAO) monthly mean nearly neutral around +0.21SD. At the same time the Pacific North American Pattern (PNA) remained positive for the 8th month in a row. It was a similar pattern to December 2023, however a positional shift in the western ridge axis from the Great Basin to the West Coast allowed for lower 500mb heights over Maine. This pattern resulted within a strong positive El Niño-Southern Oscillation (ENSO) eastern regime that saw slight decrease in NINO 3.4 SST anomalies. This pattern resulted in highly anomalous higher 500mb heights over Maine in the month of January as seen below despite them being lower than December. The 500mb trough remained focused in the Great Lakes but did allow brief cold snaps but nothing of prolonged significance. The southern branch of the Jet Stream was the dominant storm system focus once again thanks to the positive ENSO.

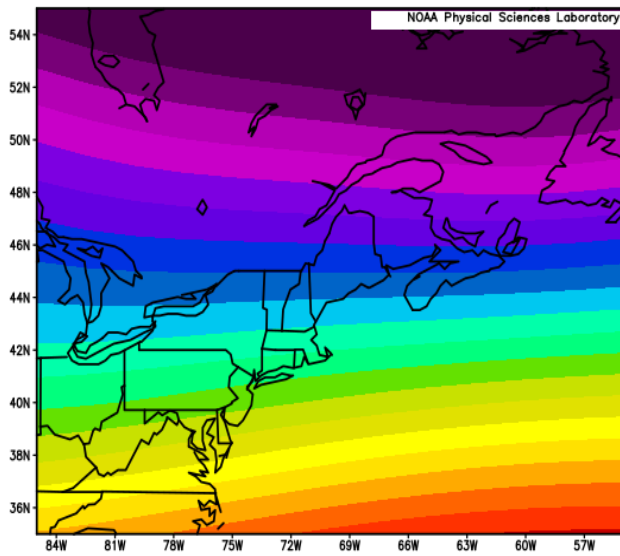


Figure 1: 500mb Geopotential Height (m) Anomalies (1991-2020 Climo)
January 2024

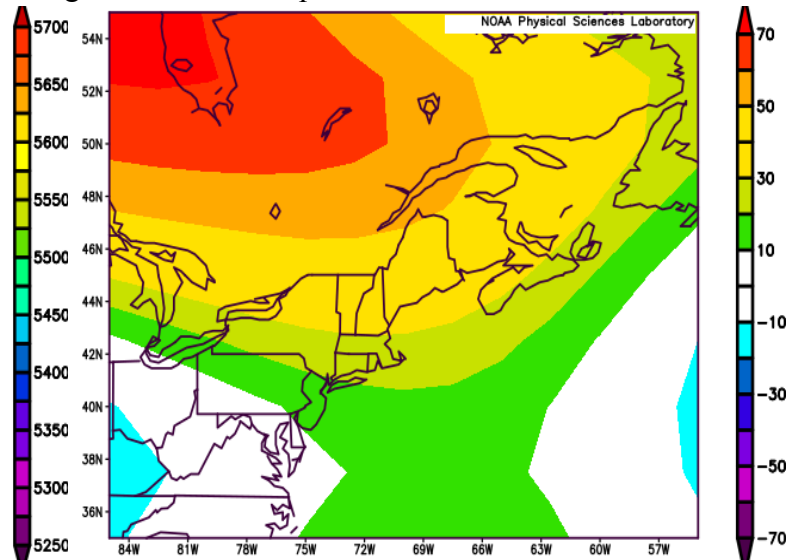


Figure 2: 500mb Geopotential Height (m) Composite Mean
January 2024

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*	0.64	1.51	-0.87	42.4%					
Fort Kent	2.41	2.78	-0.37	86.7%	21.0	20.3	0.7	19	9.9
Van Buren	1.68	2.87	-1.19	58.5%	16.1	24.5	-8.4	M	M
Caribou	2.25	2.95	-0.70	76.3%	27.5	25.0	2.5	12	6.1
Houlton	1.72	2.65	-0.93	64.9%					
Millinocket*	2.66	2.70	-0.04	98.5%	24.0			15	7.0
Greenville*	3.36	2.98	0.38	112.8%					
Moosehead*	2.51	2.69	-0.18	93.3%	29.0	20.2	8.8	17	10.3
Corinna	3.17	3.36	-0.19	94.3%	11.8	16.6	-4.8	8	4.5
Bangor	3.05	3.17	-0.12	96.2%	17.5	18.6	-1.1	6	2.4
Grand Lake Stream	3.41	3.77	-0.36	90.5%	11.4	17.8	-6.4	4	1.9
Robbinston*	4.76	4.85	-0.09	98.1%	14.1	24.8	-10.7	6	2.5
Topsfield*	3.30	4.13	-0.83	79.9%	17.9	23.6	-5.7	9	5.4

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

**Topsfield Records date back to 2000, *Robbinston Records date 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 mostly below average, except slightly above average along the coast. **Snowfall** was near average across the region. There was no inland flooding but 2 significant coastal flooding events took place and noted below because they impacted the Bangor Penobscot River forecast point. The most significant snow storms were observed on the 9th into the 10th when 2-4 inches of snow was observed along the coast and 6 to 12 inches across northern areas. Another event on the 16th also produced 2-4 inches along the coast and 6 inches to as much as a foot from Bangor northward to the St. John Valley. By the end of the month, the snow depth across the region ranged from 10 to 18 inches across most of Aroostook County and in most areas from Millinocket northward with locally up to 2 feet across the higher elevations and in the North Woods. The observation at Chimney Pond (Approx 2950ft MSL) in Baxter State Park went from 2 inches on January 2nd to 23 inches on January 31st. We thank the Park Rangers at Baxter State Park for their daily weather observations. Abol Campground in Baxter State Park (Approx 1296ft MSL) went from 3 inches in the beginning of the month to 15 inches by the end of the month. The Maine Cooperative Snow Survey Program began with the Jan 1-4, 2024 survey observations. Snow depth was mainly confined to the Central Highlands, Baxter & Moosehead Regions north to the St. John Valley. The snow water equivalent was some of the lowest observations noted for the beginning of January in the last 20 years of observations (lowest 10% of observations). By the end of the month the snow water equivalent returned to near normal in many locations but remained below normal across the eastern St. John Valley, Baxter Region and in Downeast especially Washington County. Maine Cooperative Snow Survey Program maps included below...

Streamflows... the month of January featured rapid ice building due to very high turbulent water. Significant frazil ice production in the first 10 days of January resulted in mainly 50-80% frozen Aroostook & St. John Rivers. The rivers across the Central Highlands rapidly produced ice especially by mid month resulting in significant build up of ice. Thicknesses throughout the month of January were very thin that wildlife refused to use the ice as transportation until later in the month where deer were spotted crossing the Allagash River, St. John River and Aroostook River in various spots. Natural river flows remained above normal to much above normal especially in the Central Highlands to the Downeast coast basins through to the end of the month with the Piscataquis returning to normal flows by the last couple days of the month. Northern basins started the month above normal and returned to normal by the end of the month. Downeast basins especially the St. Croix basin remained above normal by the end of the month with some locations still much above normal. See pictures attached of the ice conditions on the rivers.

Groundwater was “Above Normal” to “Much Above Normal” across the Central Highlands, Downeast, Baxter Region into the St. John Valley including Eastern Aroostook. Frozen grounds and no melting allowed for continued locking in of the groundwater from significant rainfall in early winter and late fall 2023. The only “Normal” readings were in the North Woods. Frost depths started the month generally 3-7 inches across Northern Maine, Baxter and Moosehead regions eastward to Danforth. Much of the Central Highlands and Downeast varied from thawed grounds to up to 3 inches of frost. The rain/flood events in December 2023 caused a complete loss of frost. By the end of the month we saw significant frost build in most locations. In Northern Maine we saw generally 8-12 inch frost depths with 5-10 inches across the Downeast and Central Highlands. Here at the National Weather Service Weather Forecast Office in Caribou we went from a frost depth of 6 inches on January 2nd to 10 inches by January 16th and then 12 inches on January 30th.

Temperatures... across the area ranged mainly from 3.5 to 5 degrees above 1991-2020 normals, but this was not enough that any of the long term climates had a top 10 warmest January.

Town/City	Avg Monthly Temperature (°F)	Normal Monthly Temperature (°F)	Departure from Normal (°F)
Frenchville	15.2	11.3	3.9
Fort Kent	13.8	7.9	5.9
Van Buren	13.6	7.4	6.2
Caribou	16.6	11.7	4.9
Houlton	16.6	12.9	3.7
Millinocket	20.0	15.5	4.5
Greenville*	18.6	14.2	4.4
Moosehead	17.6	13.0	4.6
Corinna	22.3	17.1	5.2
Bangor	23.3	18.5	4.8
Grand Lake Stream	23.0	18.0	5.0
Robbinston*	23.9	19.9	4.0
Topsfield*	20.0	15.6	4.4

**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.

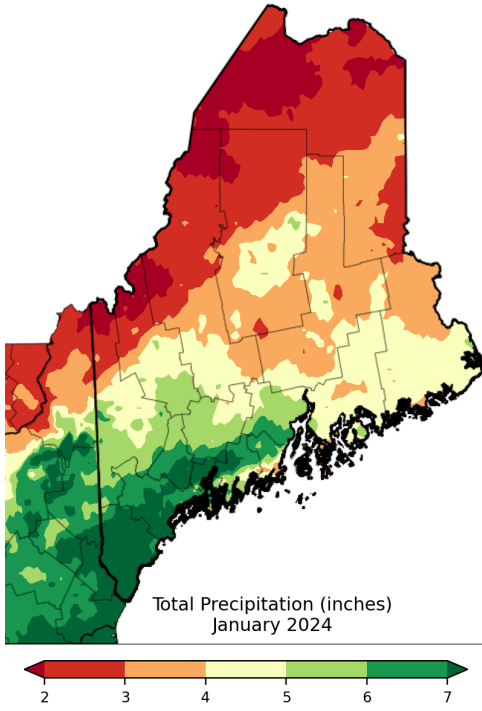


Figure 3: Total Liquid Precipitation for January

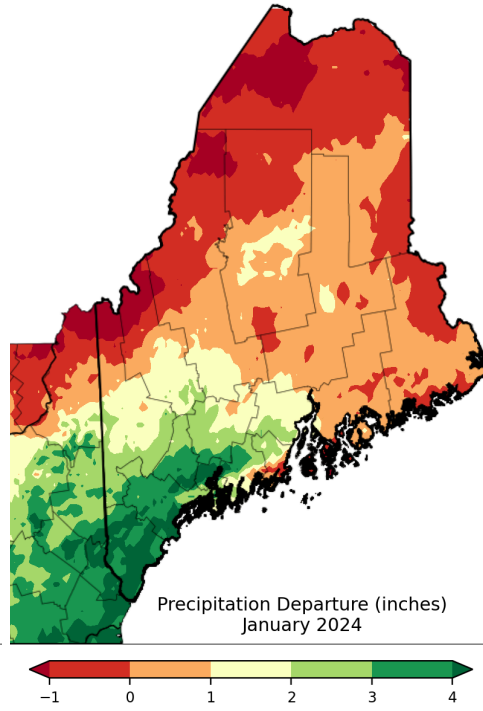


Figure 4: Liquid Precipitation Departure for January
Source: [Northeast Regional Climate Center](#)

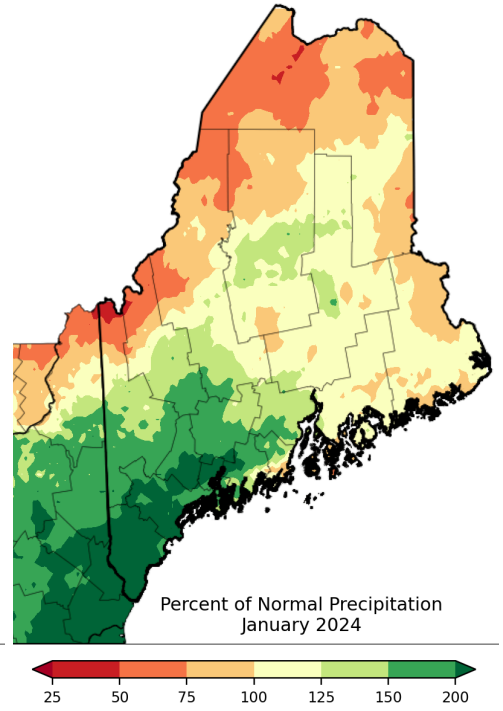


Figure 5: Percent of Normal Precipitation for January

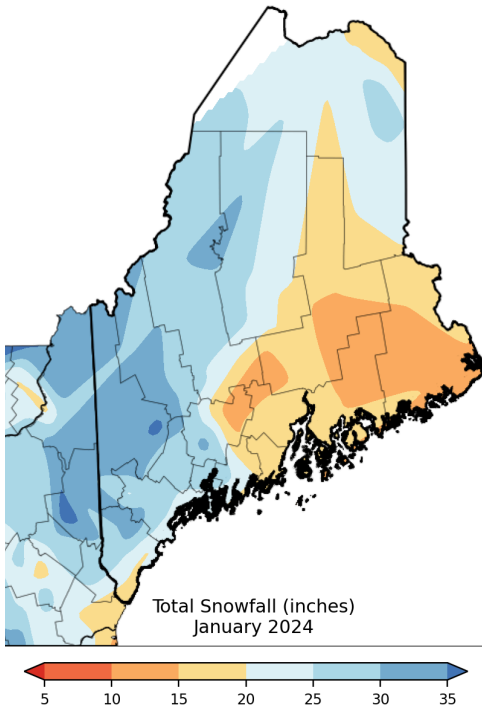


Figure 6: Total Snowfall for January

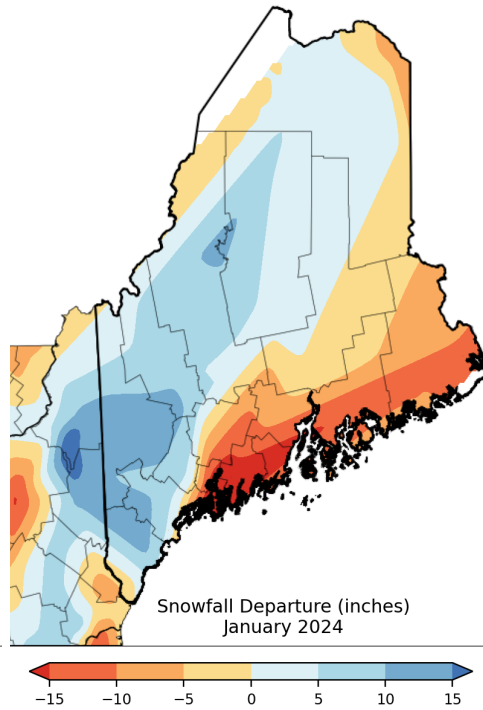


Figure 7: Total Snowfall Departure for January
Source: [Northeast Regional Climate Center](#)

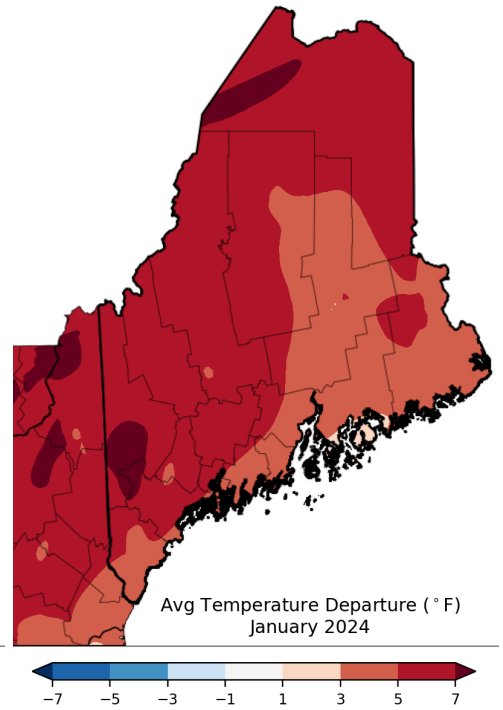


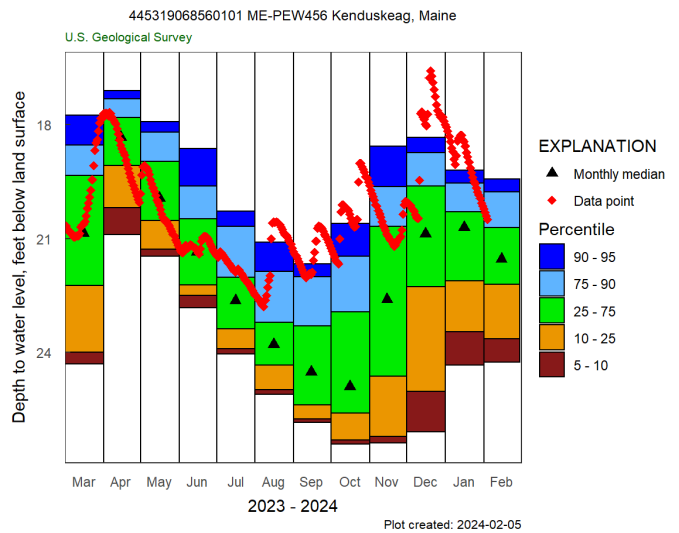
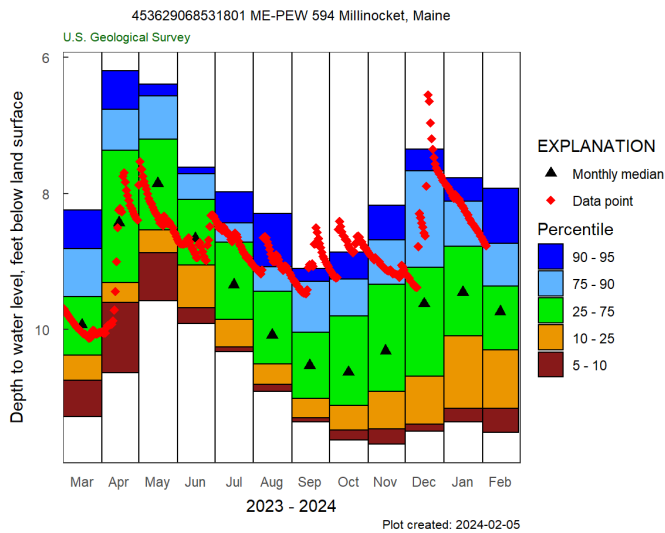
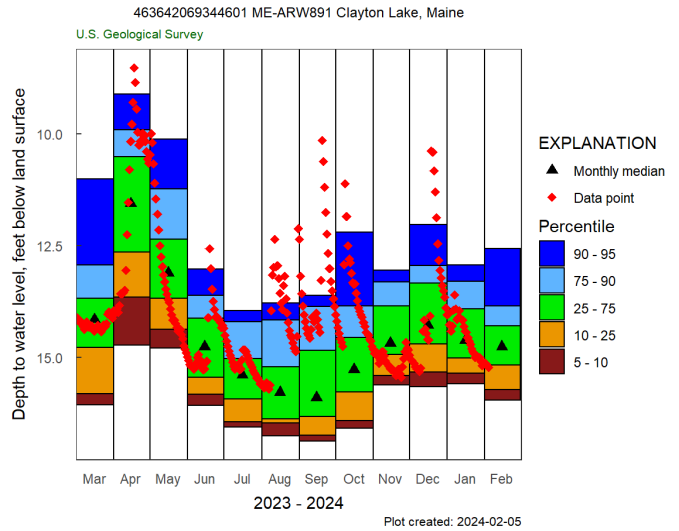
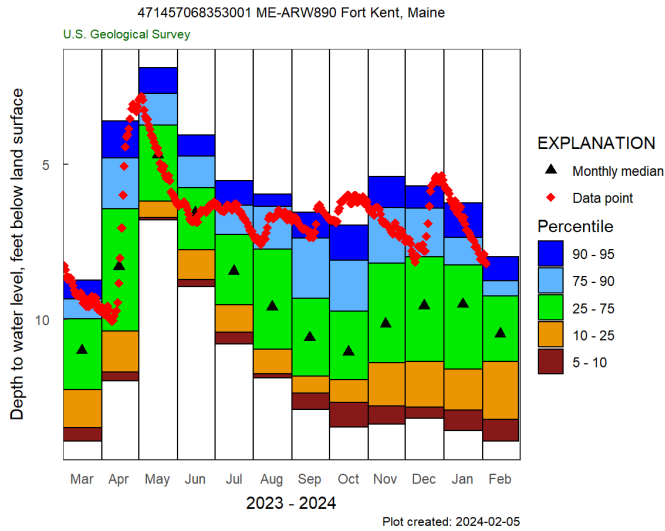
Figure 8: Average Temperature Departure for January

January Streamflows for Rivers
 Data provided by the U.S. Geological Survey

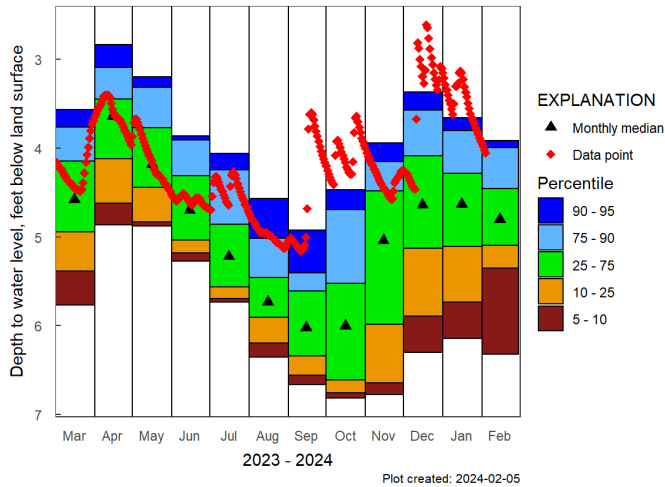
River	Monthly Mean Flow (cfs)	% Normal (mean)	Percentile Class	Drainage (mi²)	Years of Record
Big Black River near Depot Mtn	NA	NA	Ice Impacted	171	39
St. John River at Nine Mile Bridge	NA	NA	Ice Impacted	1341	72
Allagash River near Allagash	NA	NA	Ice Impacted	1478	93
St. John River at Dickey	NA	NA	Ice Impacted	2680	78
St. John River at Fort Kent	NA	NA	Ice Impacted	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	416	53.09%	Below Normal	413	94
St. Croix River at Baring	1872.18	75.92%	Normal	1374	63
Grand Lake Stream at Grand Lake Stream	631.81	167.38%	Above Normal	228.3	94
Narraguagus River at Cherryfield	1161.19	220.81%	High	227	74
East Branch Penobscot River at Grindstone	NA	NA	Ice Impacted	837	102
Mattawamkeag near Mattawamkeag	1778.39	112.53%	Normal	1418	88
Piscataquis River near Dover-Foxcroft	396.97	119.69%	Normal	298	120
Sebec River at Sebec	886.65	205.60%	Much Above Normal	326	67
Piscataquis River at Medford	NA	NA	Ice Impacted	1162	91
Penobscot River at West Enfield	NA	NA	Ice Impacted	6422	120

January Average Groundwater Levels

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



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



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

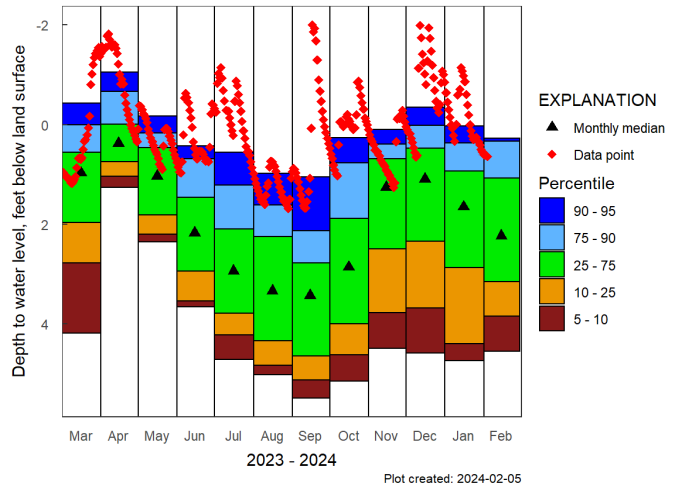


Figure 9-14: Groundwater Level Yearly Plots to Current
Source: [United States Geological Survey](https://www.usgs.gov/)

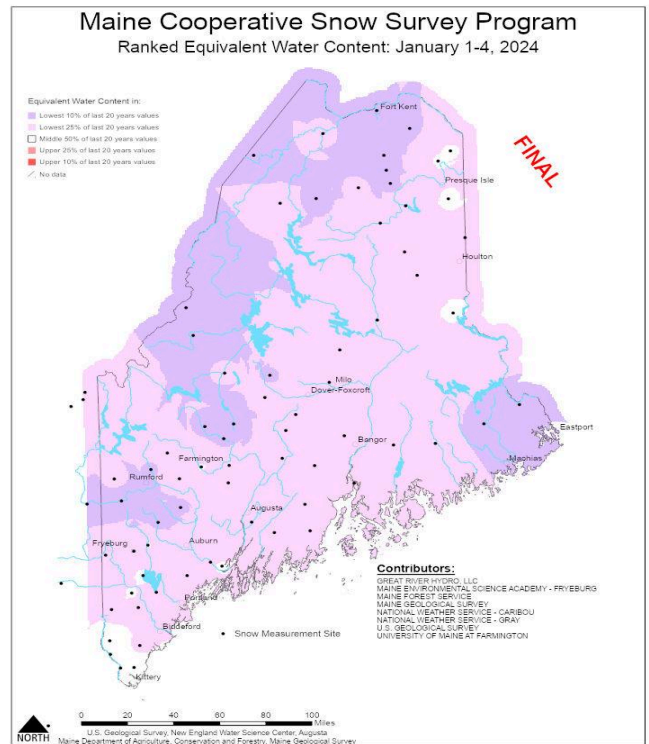
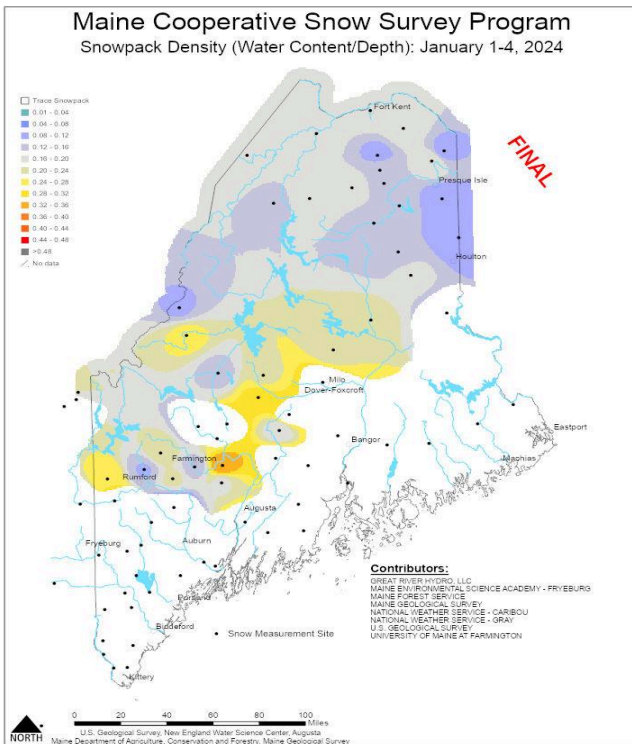
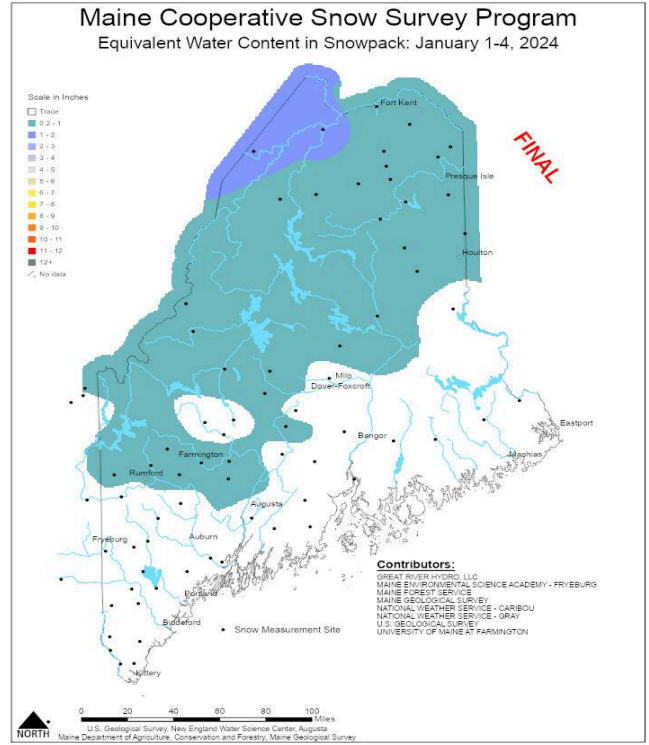
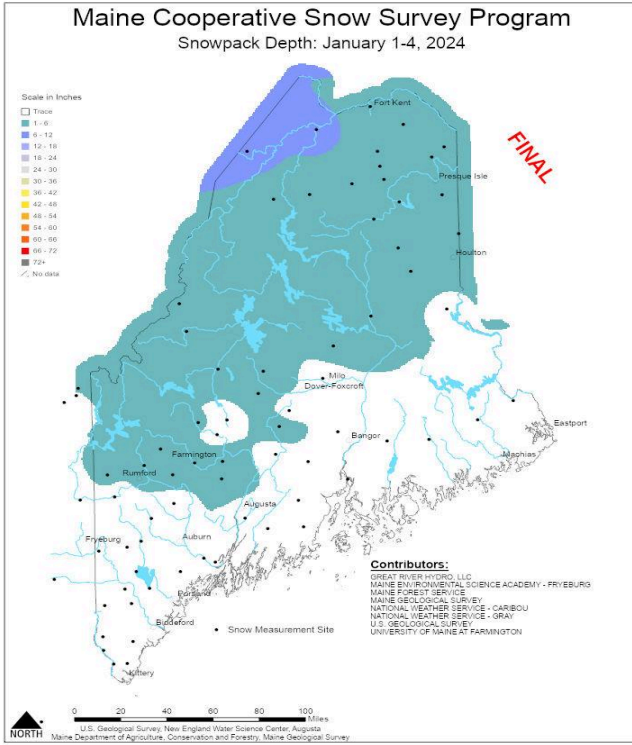
Flow or Water Level	Percentile Range	Explanation
Ice Impacted	NA	Ice impacted resulting in No Data available
Low	0 th	The monthly mean streamflow or median water level during this month is the lowest ever recorded during the period of record for this site.
Much Below Normal	0 th to 10 th	The monthly 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 January 2024

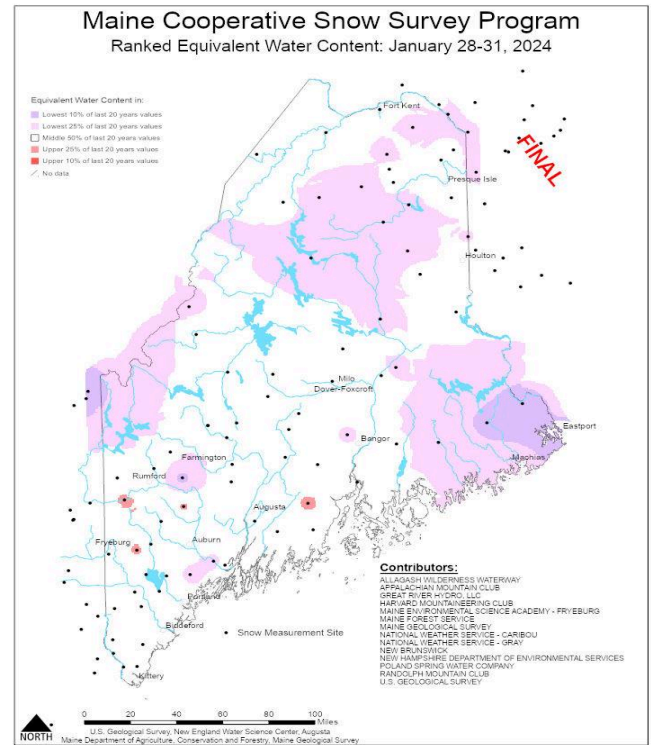
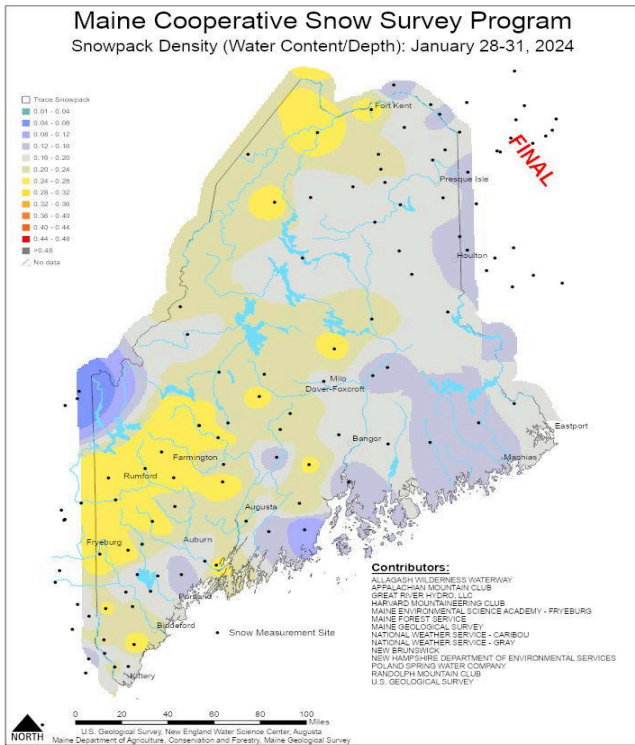
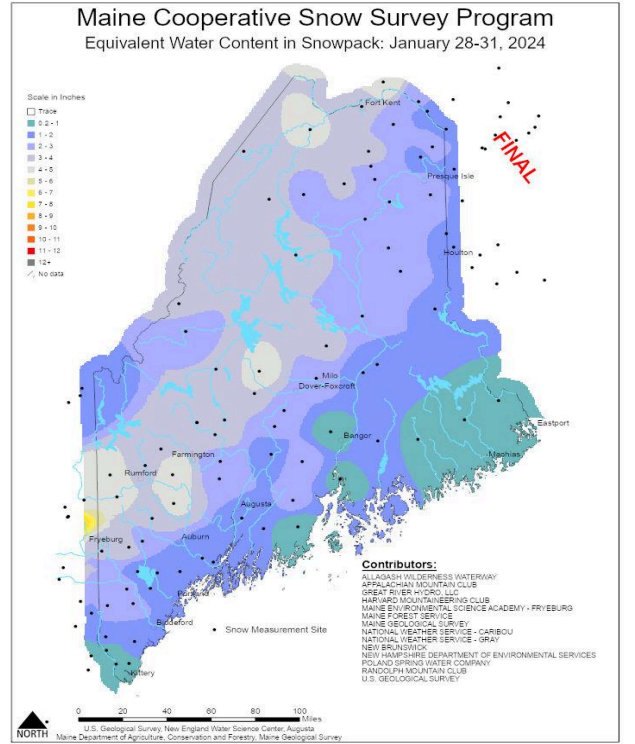
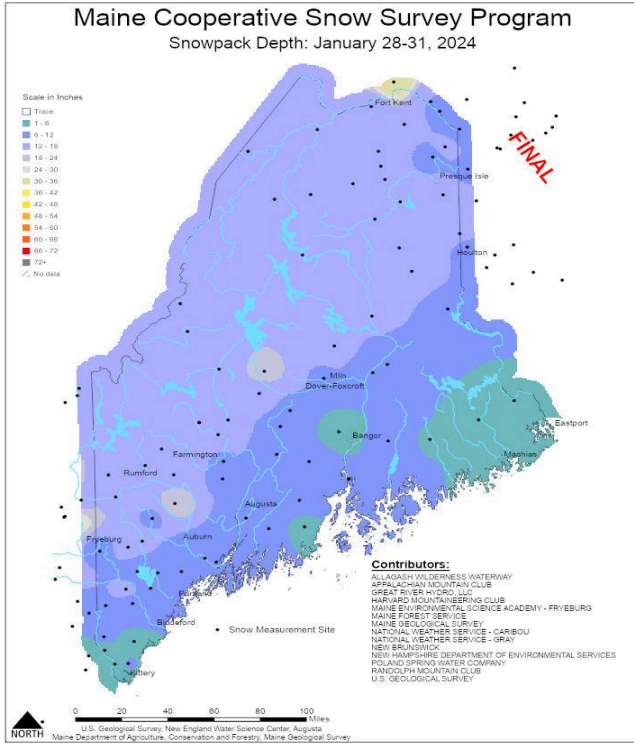
Product	How Many Issued	Reason for Issuance
River Flood Warning	2	Storm Surge Flooding Bangor River Gage

Maine Cooperative Snow Survey Program Comparison January 4th vs January 31st

January 4th Report: Snowpack Depth, SWE, Density, SWE Ranking



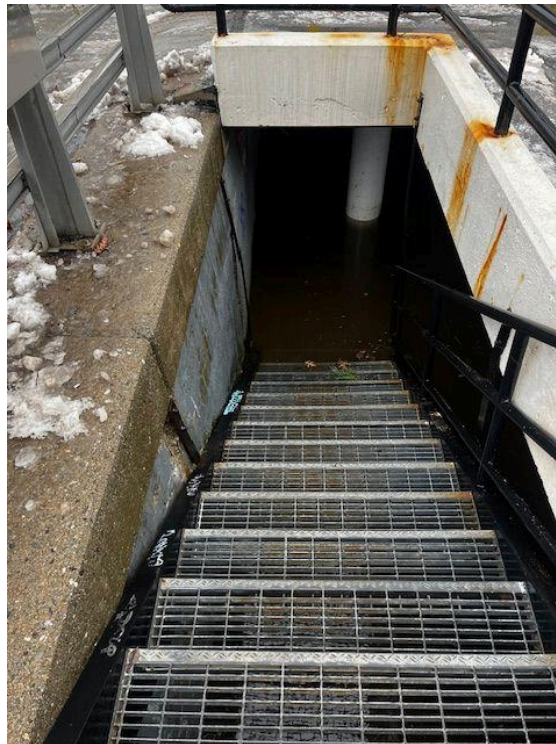
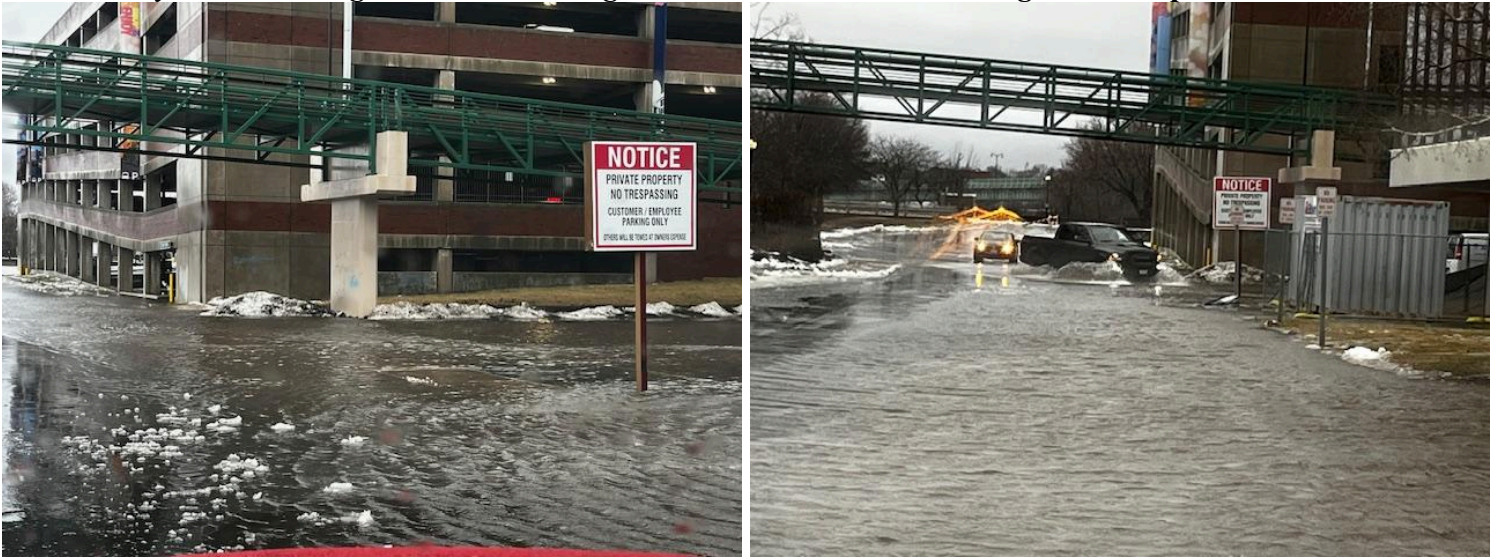
January 31st Report: Snowpack Depth, SWE, Density, SWE Ranking



Bangor Maine Coastal Flooding January 10th & 13th

River Flood Warnings (FLW) were issued on these two dates for a storm surge up the Penobscot River that resulted in flooding in Bangor Waterfront and Brewer Waterfront. Majority of the impacts were on January 10th in the Kenduskeag Plaza. The freshwater discharge was elevated but didn't contribute to the flooding as this was a reverse flow flooding caused by storm surge. January 10th storm surge was estimated to be 4-5ft while the surge on January 13th was estimated to be 2-2.5ft.

January 10th Flooding in the Kenduskeag Plaza. Pictures thanks to Bangor Fire Department.



January 13th Flooding in the Kenduskeag Plaza. Picture thanks to Michael Seile Sr.



General River Ice Pictures for January 2024

January 29th, Allagash River, Allagash. Deer crossing jumbled ice.
Courtesy: NWS Meteorologist Angela LaFlash



January 16th, Penobscot River, Bangor Waterfront.
Leftover Ice after Coastal Flooding Event.



January 16th, Meduxnekeag River, Houlton



January 15th, Fish River, Fort Kent
Just frazil ice in the main flow with some bank ice.



January 31st, Aroostook River, Caribou, Below Fort Fairfield Road Bridge
Some open water thanks to the upstream dam.



January 31st, St. John River & Fish River Confluence, Fort Kent



January 30th, Aroostook River @ Scopan Stream Confluence, Masardis/Ashland Townline
Discharge from the Scopan Dam continues to keep the Aroostook mostly open into Ashland.



January 31st, Aroostook River, Fort Fairfield



January 16th, Piscataquis River, Howland (I-95SB Overpass)



January 16th, Kenduskeag Stream, Bangor Kenduskeag Plaza

