Sheridan County Water Supply Report

December - 2023

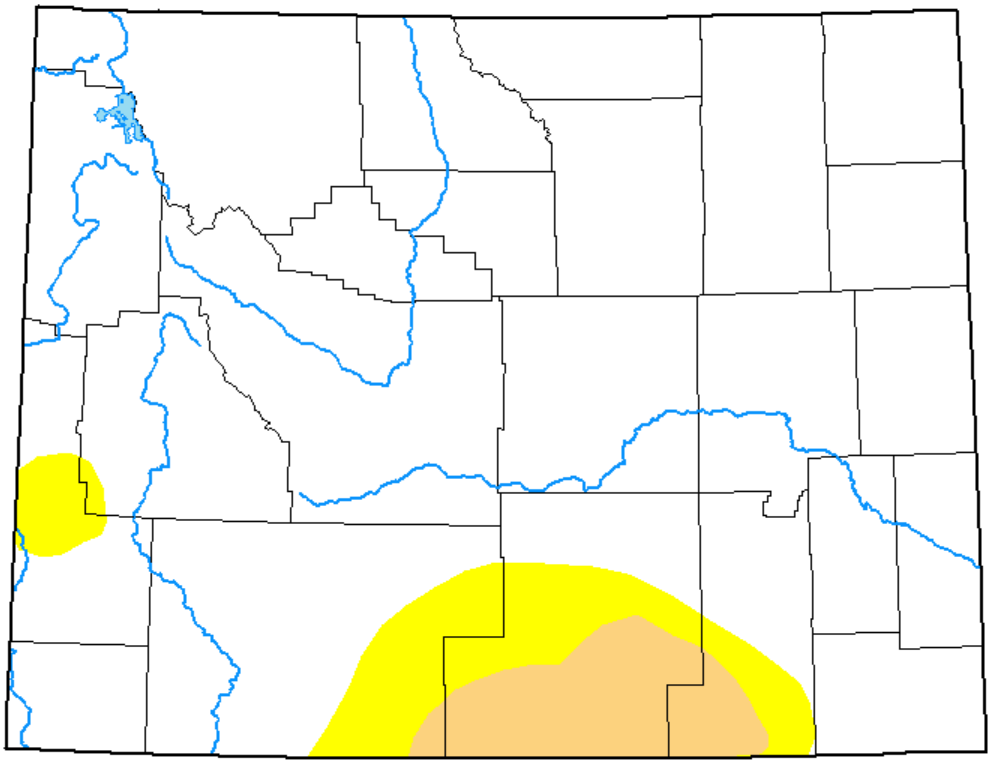
U.S. Drought Monitor

Wyoming

November 28, 2023

(Released Thursday, Nov. 30, 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:

David Simeral
Western Regional Climate Center

droughtmonitor.unl.edu

Map Source: The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration.

Sheridan Community LAND TRUST
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How to Use This Report

What is this report?

Instead of combing the internet and clicking a million links to learn about water supply in Sheridan County, let us do the work for you! This report compiles many trustworthy sources into an easy-to-read and access report. It includes information about streamflow, snowpack, drought, soil moisture, and precipitation for both the Tongue and Powder Rivers. This report is a one-stop shop for information that can help you be aware of water in Sheridan to make decisions for your ranch and your land.

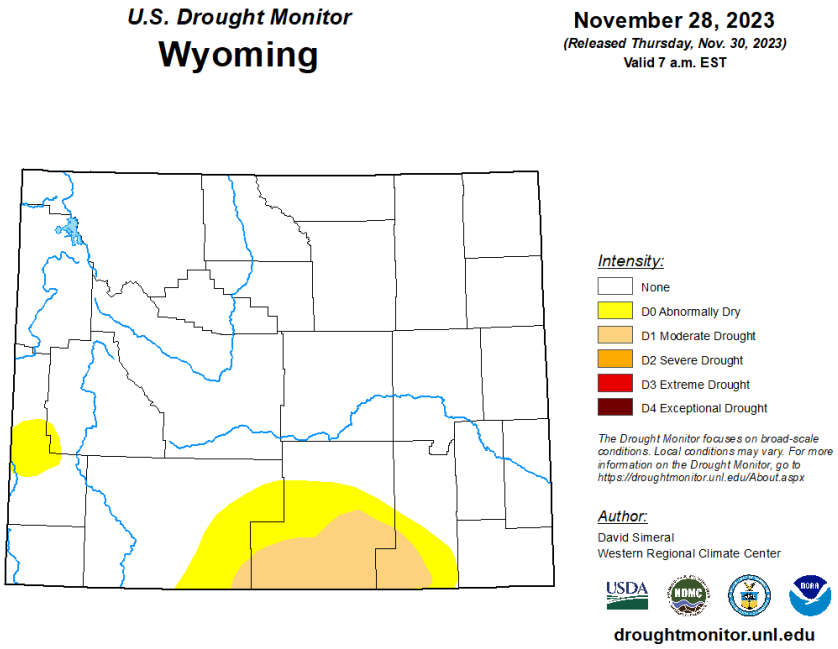
Helpful Hints:

- All forecasts have the word forecast underlined in the page's title.
- Each page has a little blurb at the top that gives you some helpful information.
- If you would like to know more about a topic, check out the sources at the bottom of the page!
- Sources are precise and bring you as close as possible to the original source.

Table of Contents

Drought Index and Change

The U.S. Drought Monitor gives you a broad overview of the drought conditions in the US. Its strength is bringing together many ways of determining drought. It is useful as a large-scale view of drought, but local drought resiliency efforts are not considered.

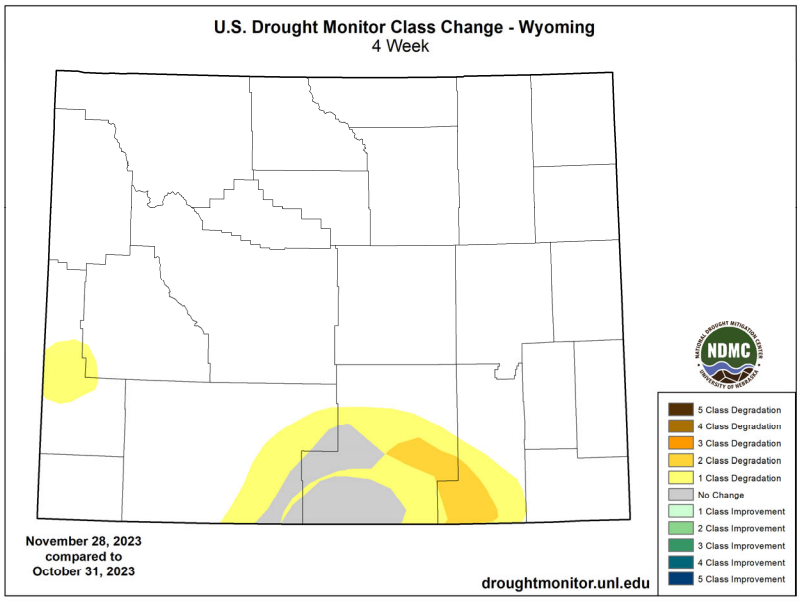


Current Drought Monitor:

Just like last month, no portion of Sheridan County is experiencing drought conditions. Most of Wyoming continues to stay out of drought conditions, although drought conditions on the southern side have persisted and expanded.

Change in Drought Monitor:

There has been no change in drought conditions for Sheridan County. Compared to the beginning of November, the drought in Carbon County has expanded into Albany County, which is experiencing class 1 and class 2 degradation. This translates to the Abornmally Dry and Moderate Drought conditions seen in the graph above for Carbon, Sweetwater, and Albany County. Abnormally dry conditions have also developed in Lincoln County.



Cooler tones represent improvement. Warm tones represent degradation.

Sources: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx
https://droughtmonitor.unl.edu/Maps/ChangeMaps.aspx
https://droughtmonitor.unl.edu/Summary.aspx

Drought History and Forecast

The first half of this page shows current conditions, followed by the forecast. Current and historical data is based on known measured data. The outlook is a prediction of the future, so while it is helpful for making decisions be sure to factor in the level of uncertainty.

Drought in Sheridan County Over Time: Shown in Percentage Area in Drought

Week	Date	None	D0	D1	D2	D3	D4	DSCI
Current	2023-11-28	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week to Current	2023-11-21	100.00	0.00	0.00	0.00	0.00	0.00	0
3 Months Ago to Current	2023-08-29	100.00	0.00	0.00	0.00	0.00	0.00	0
Start of Calendar Year to Current	2022-12-27	94.99	5.01	0.00	0.00	0.00	0.00	5
Start of Water Year to Current	2023-09-26	100.00	0.00	0.00	0.00	0.00	0.00	0
One Year Ago to Current	2022-11-29	93.52	6.48	0.00	0.00	0.00	0.00	6

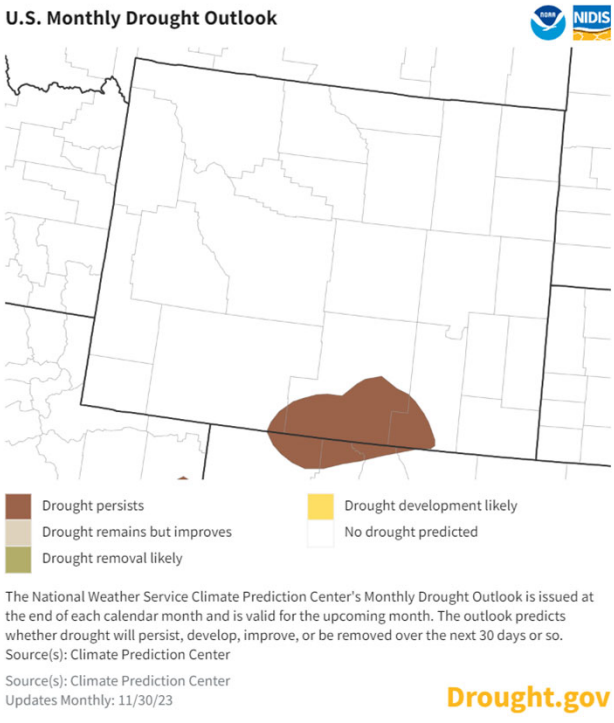
DSCI stands for Drought Severity and Coverage Index. It is "an experimental method for converting drought levels from the U.S. Drought Monitor map to a single value for an area."

History of Drought Monitor: Last year, in December of 2022, just 6.48% of Sheridan County was experiencing abnormally dry conditions (D0). Conditions over the summer held steady as Sheridan County continued to stay drought-free.

Forecast for Drought Monitor:

Looking into December, NOAA reports: "During December, a fairly dry climatology and increasingly cold temperatures favors drought persistence. Any precipitation that occurs will increasingly fall as snow, which is unlikely to significantly recharge the soils through the end of the month."[1]

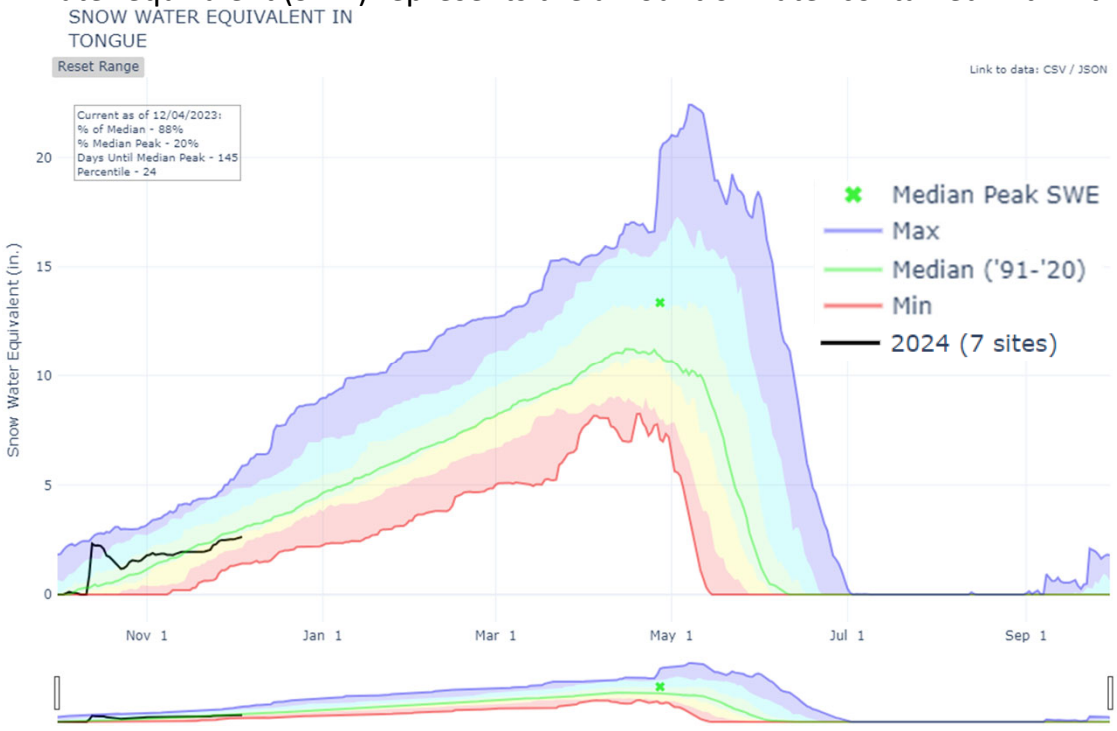
Forecast confidence is moderate to high.

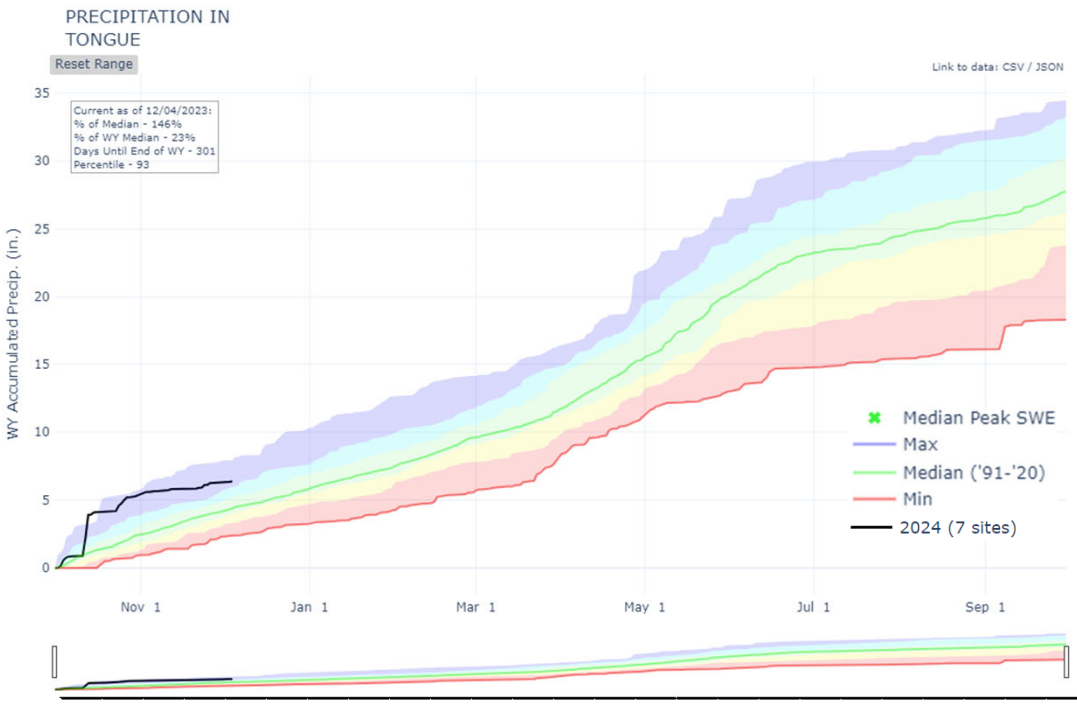


Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
https://www.drought.gov/forecasts
1https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php
https://droughtmonitor.unl.edu/Summary.aspx

Precipitation - Tongue River

These graphs represent precipitation in the Big Horn Mountains that affect the Tongue River. Snow water equivalent (SWE) represents the amount of water contained within the snowpack when it melts.





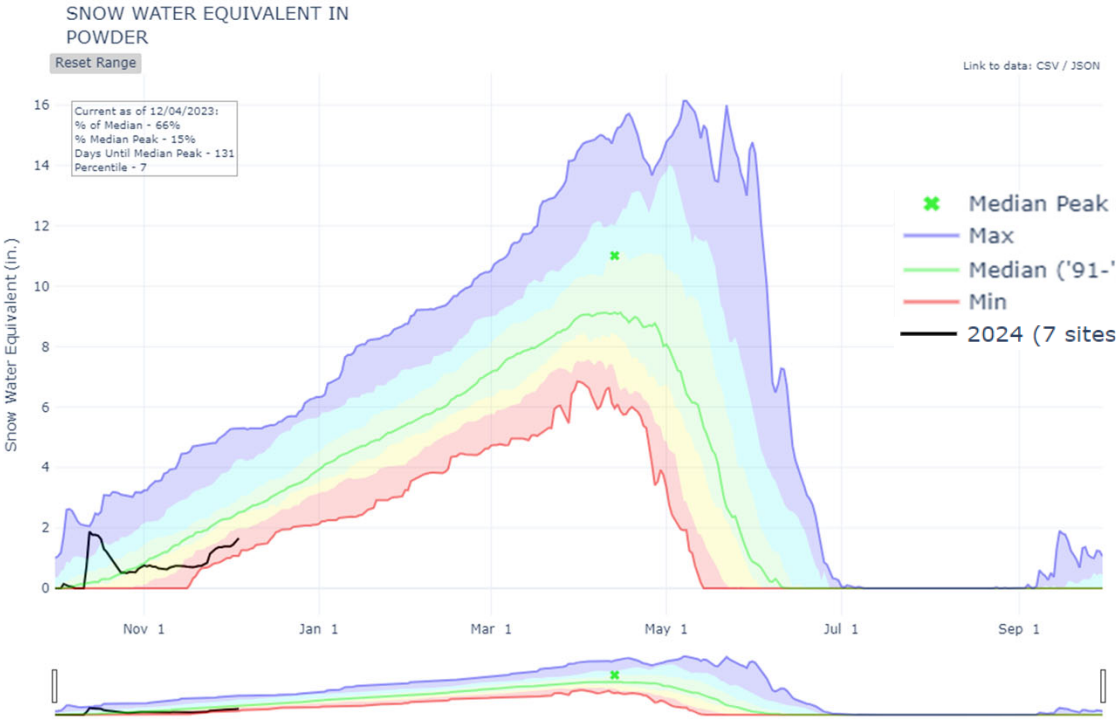
Precipitation and Snow Water Equivalent in Tongue River Watershed: :

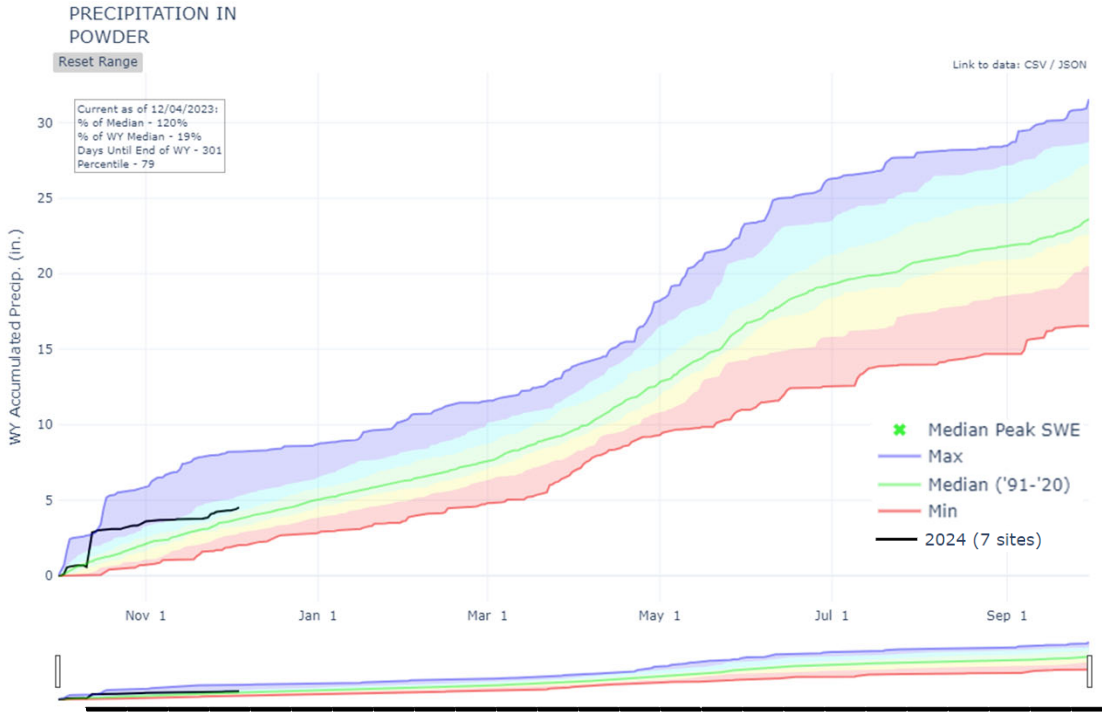
Precipitation in the Tongue River Water Shed continues to be above normal. As of December 4, precipitation is 146% of median for the Tongue River watershed. Meanwhile, snow-water equivalent trends below normal at 88% of median.

Sources:
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100901_Tongue.html
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/100901_Tongue.html

Precipitation - Powder River

These graphs represent precipitation in the Big Horn Mountains that affect the Powder River. Snow water equivalent represents the amount of water contained within the snowpack when it melts.





<u>Precipitation in Powder River Watershed:</u> Snow Water Equivalent for November was well below normal at 66% of median. Despite this, accumulated precipitation in the Powder River watershed is above normal and currently 120% of median. This is likely due to a high precipitation event in October, followed by less snow or rain in November.

Sources:
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100902_Powder.html
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/100902_Powder.html

Reservoir Capacity and Stream Flow

The total capacity of reservoirs and current water storage includes all the water in the reservoir including unusable water beneath the outtake.

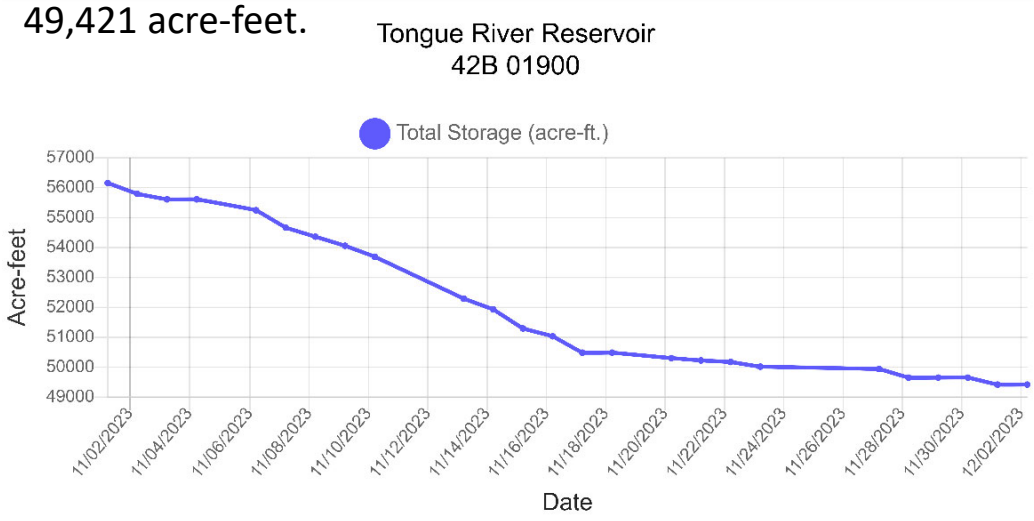
Lake DeSmet

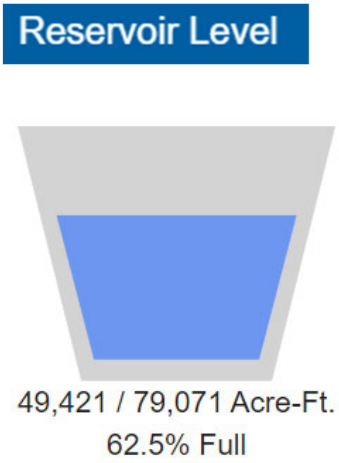
As of December 1, Lake DeSmet has a total of 200,840 acre-feet in storage, a small decrease from November.

Reservoir	Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	2,620	5,756	4,624	45.5
Cross Creek	408	798	798	51.1
Dome Lake No.1	133	1,506	1,506	8.8
Kearney Lake	2,846	7,500	6,324	37.9
Park	6,261	12,500	10,362	50.1
Sawmill	943	1,831	1,275	51.5

Tongue River Reservoir

Water levels at Tongue River Reservoir decreased 11% over the last month, from 55,610 acre-feet to 49,421 acre-feet.





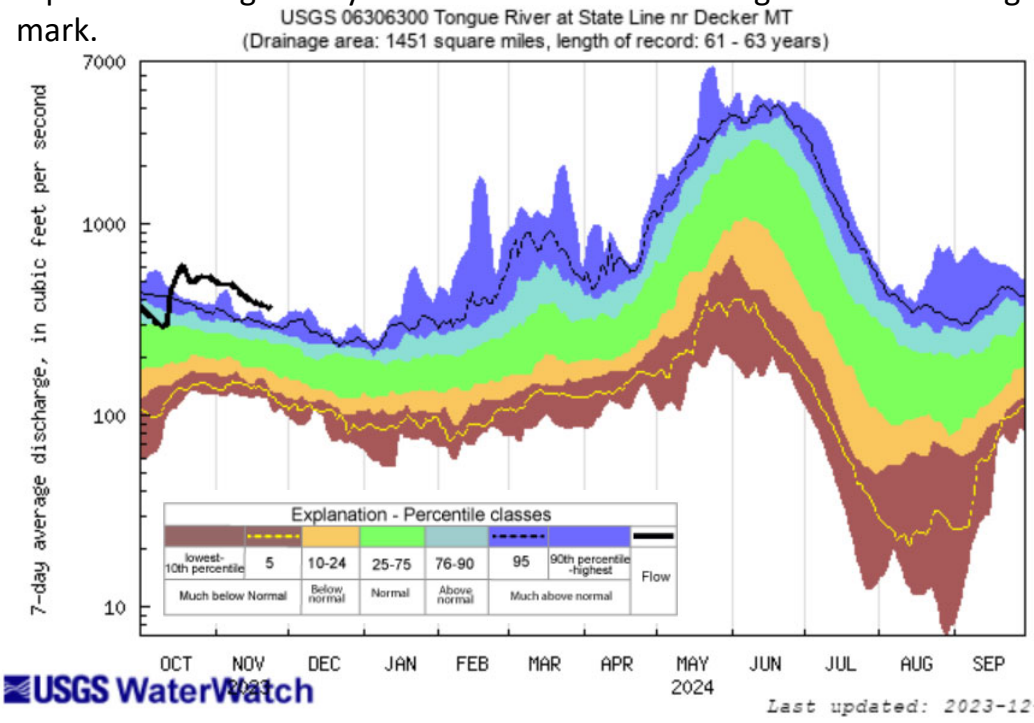
Period of Record: 01/31/1939 - 12/02/2023

This graph displays the real time data of the Togue River Reservoir. This data remains provisional until it is officially reviewed due to variables that can affect the gages. Things that can effect that data includes but not limited to algal and aquatic growth, sediment movement, malfunction of recording equipment, and back water from ice or debris such as log jams.

Sources:
Lake DeSmet Operating Department at lakedesmet@johnsoncowy.us
https://seoflow.wyo.gov/Data/Map/Parameter/Total%20Storage/Location/Identifier/Interval/Latest
https://gis.dnrc.mt.gov/apps/stage/gage-report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/

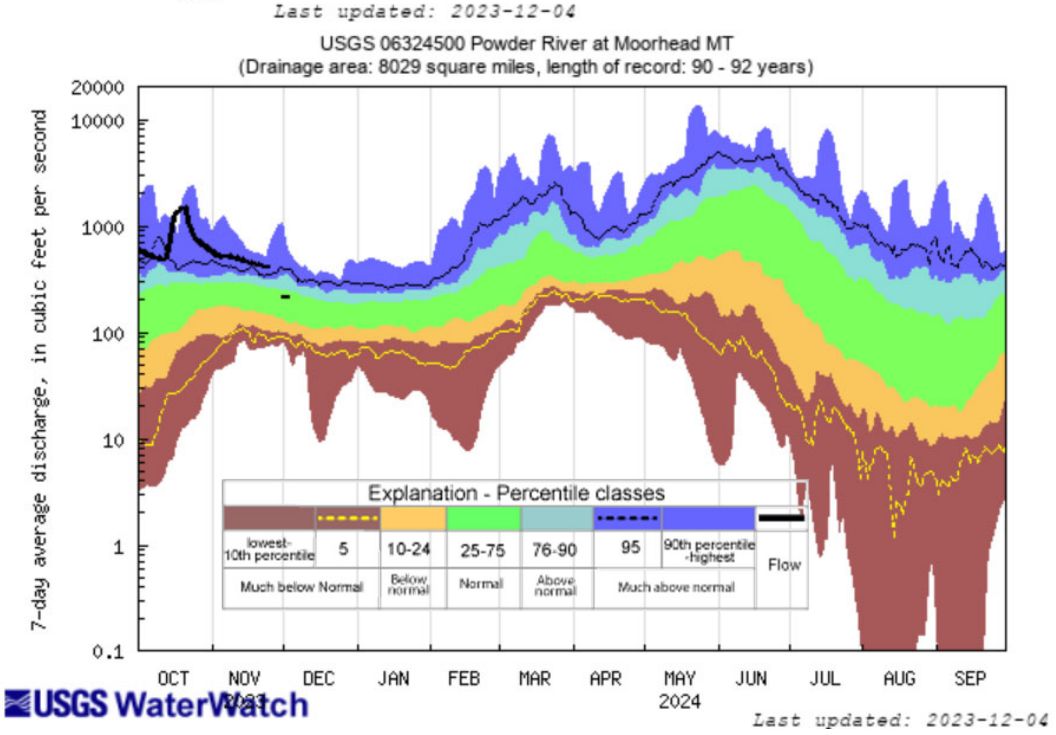
Select Stream Flow Stations

These graphs give context to stream flow percentile classes. The selected USGS stream gauges are on the stateline with Montana, being the downstream end of the Tongue and Powder within our region. The flow represent average 7-day flows. The vertical axis is logarithmic meaning it goes up by 10x for each major tick mark.



Tongue River Border Station Stream Flow: The average flow for the month of November was reported at approximately 300 cfs. This is lower than last month, but is still considered high for the time of year. At the time of this report, we have exceeded the 95th percentile for flow in December.

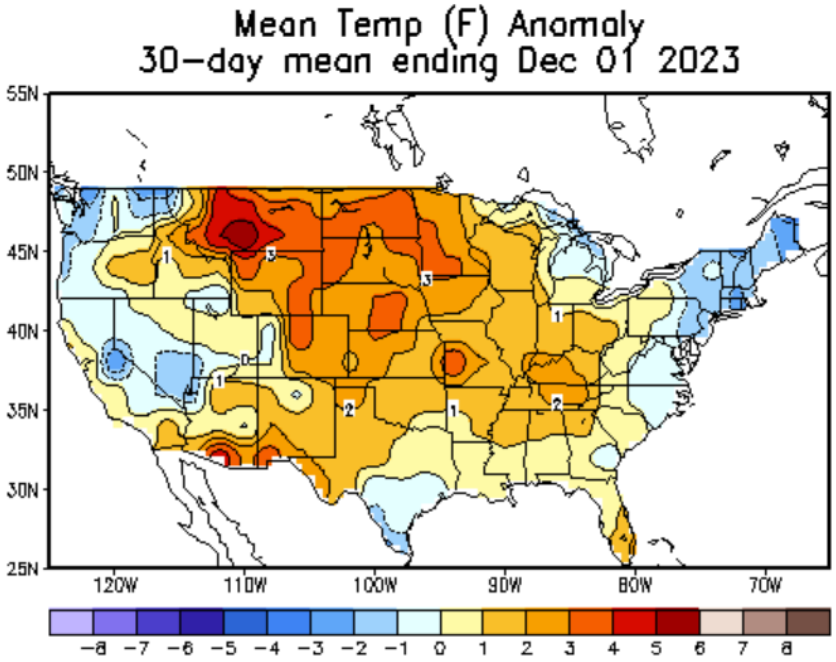
Powder River Border Station Stream Flow: Average flow in November was reported around 400 cfs. This is much lower than in October, but is still high for this time of year. For December, streamflow is currently just above the 95th percentile.



Sources: https://waterwatch.usgs.gov/index.php?id=mv01d
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06324500

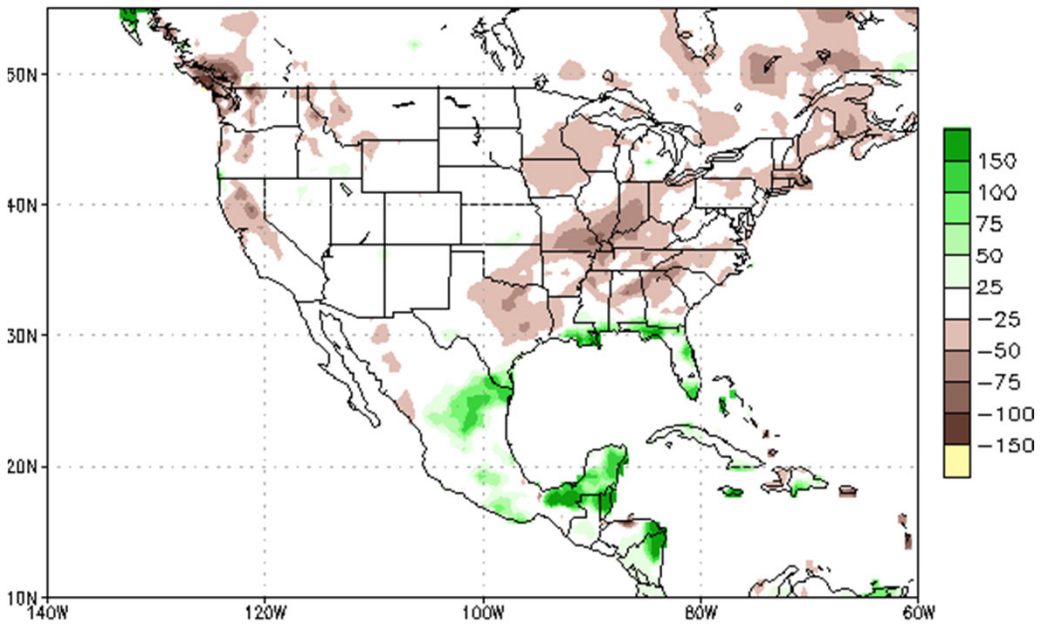
Temperature and Precipitation

Temperature and precipitation are large drivers of changes in drought conditions. As you might expect, high temperatures and low precipitation can worsen drought conditions while low temperature and high precipitations can improve them.



Temperature Anomaly:
The average temperature in November was between 35 and 40 degrees, which is 2 to 3 degrees above average for Sheridan County based on previous years.

Precipitation Anomaly:
The precipitation anomaly for most of Sheridan County was between 0-25 mm.

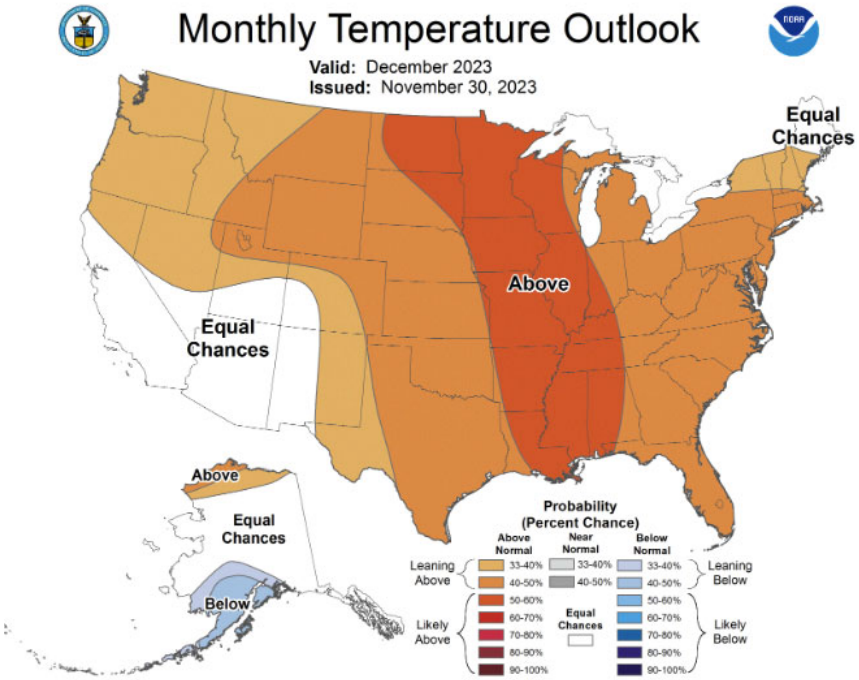


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1991-2020)

Sources: https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php
https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

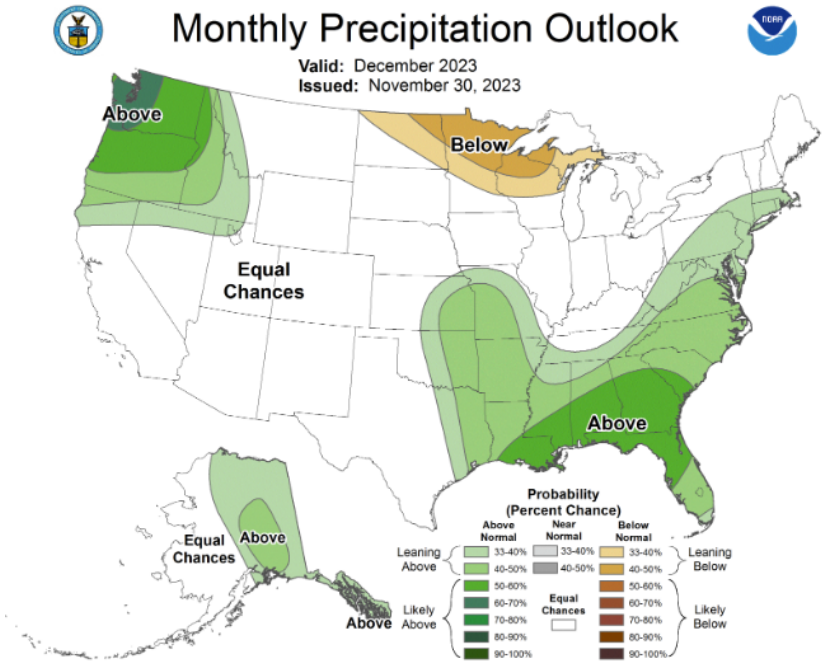
Temperature Forecast and Precipitation Forecast

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php
Explore link above for an Interactive map that displays percentage chance above and below normal for



Temperature: Sheridan County has a 40% chance for temperatures being above average in the month of November.

Precipitation:
Precipitation is expected to be around average with an equal chance of it being higher or lower.



Sources: https://www.cpc.ncep.noaa.gov/
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php – Interactive with percentages
https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

Additional Resources

These are the broad sources we got information from. These websites are trustworthy and are reliable sources for additional information. In the future we hope to add more source for additional information.

- https://droughtmonitor.unl.edu
- https://www.drought.gov
- https://www.cpc.ncep.noaa.gov
- https://www.nrcs.usda.gov/wps/portal/wcc/home
- https://waterwatch.usgs.gov
- Lake DeSmet Operating Department at lakedesmet@johnsoncowy.us
  http://dnrc.mt.gov/divisions/water/projects/tongue-river
- https://seoflow.wyo.gov/Data/Map/Parameter/Total%20Storage/Location/Identifier/Interval/Latest
- https://vegdri.unl.edu/Home/VegDRIQuad.aspx?WY,2