Sheridan County Water Supply Report

January - 2024

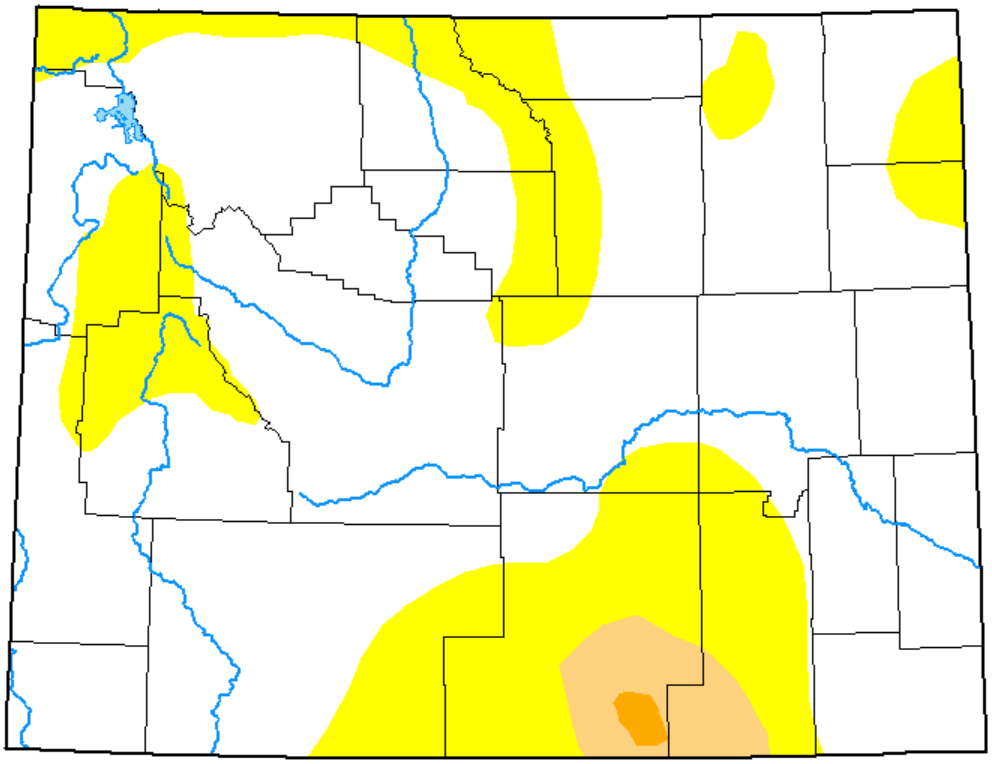
U.S. Drought Monitor

Wyoming

January 2, 2024

(Released Thursday, Jan. 4, 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:

Lindsay Johnson
National Drought Mitigation 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
Conservation | History | Recreation

Connecting people to land and history

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:

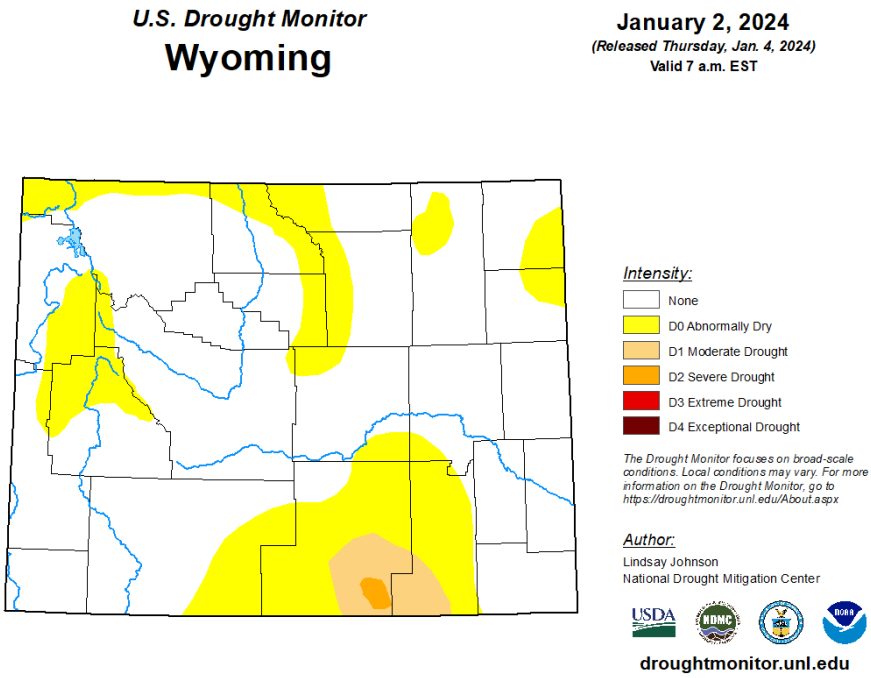
- All forecasts have the word forecast underlined in the page's title.
- Each page has a little blurb at the top that gives you some helpful information.
- If you would like to know more about a topic, check out the sources at the bottom of the page!
- Sources are precise and bring you as close as possible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

Table of Contents

Drought Index and Change	4
Drought History and Forecast	5
Precipitation - Tongue River	6
Precipitation - Powder River	7
Stream Flow and Reservoirs	8
Select Stream Flow Stations	9
Water Supply Forecast-Tongue River Basin	10
Water Supply Forecast- Powder River Basin	11
Temperature and Precipitation	12
Temperature and Precipitation Forecasts	13

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.

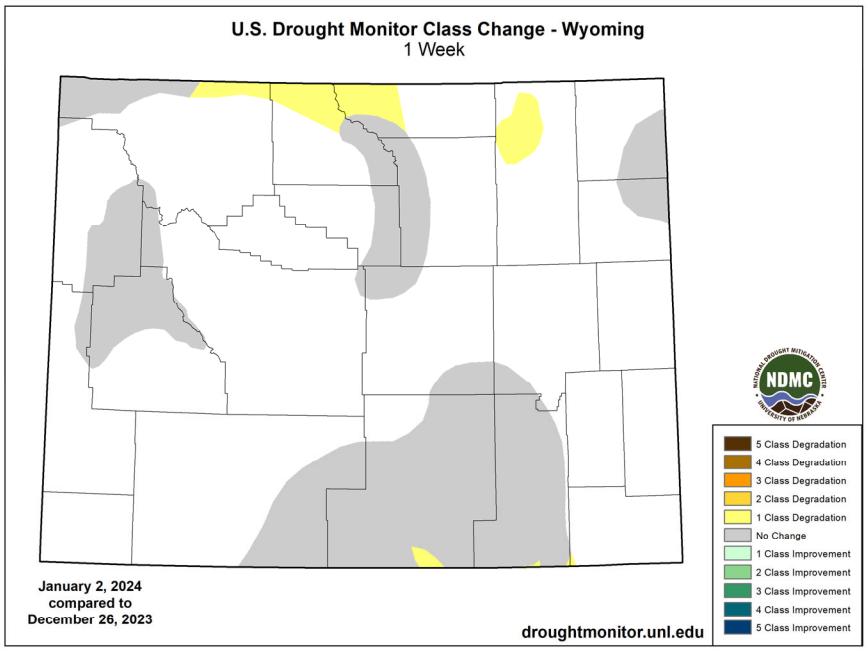


Current Drought Monitor:

Most of the county has faired well through a dry December, but D0 (abnormally dry) conditions have crept into the western side of Sheridan County.

Change in Drought Monitor:

In most of the state, there has not been any change. Drought conditions in the southern side of the state largely have not improved or degraded. However, conditions on the north side including western Sheridan County experienced class 1 degradation.



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

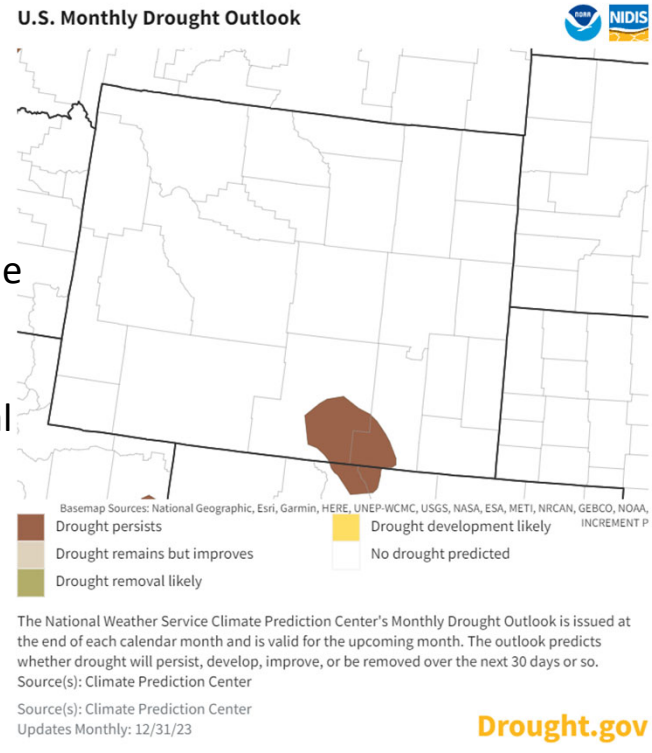
Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2024-01-02	62.95	37.05	0.00	0.00	0.00	0.00	37
Last Week to Current	2023-12-26	90.06	9.94	0.00	0.00	0.00	0.00	10
3 Months Ago to Current	2023-10-03	100.00	0.00	0.00	0.00	0.00	0.00	0
Start of Calendar Year to Current	2023-12-26	90.06	9.94	0.00	0.00	0.00	0.00	10
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	2023-01-03	94.99	5.01	0.00	0.00	0.00	0.00	5

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 January of 2023, just 5% of Sheridan County was experiencing abnormally dry conditions (D0). This year is much drier than last year at this same time.

Forecast for Drought Monitor:

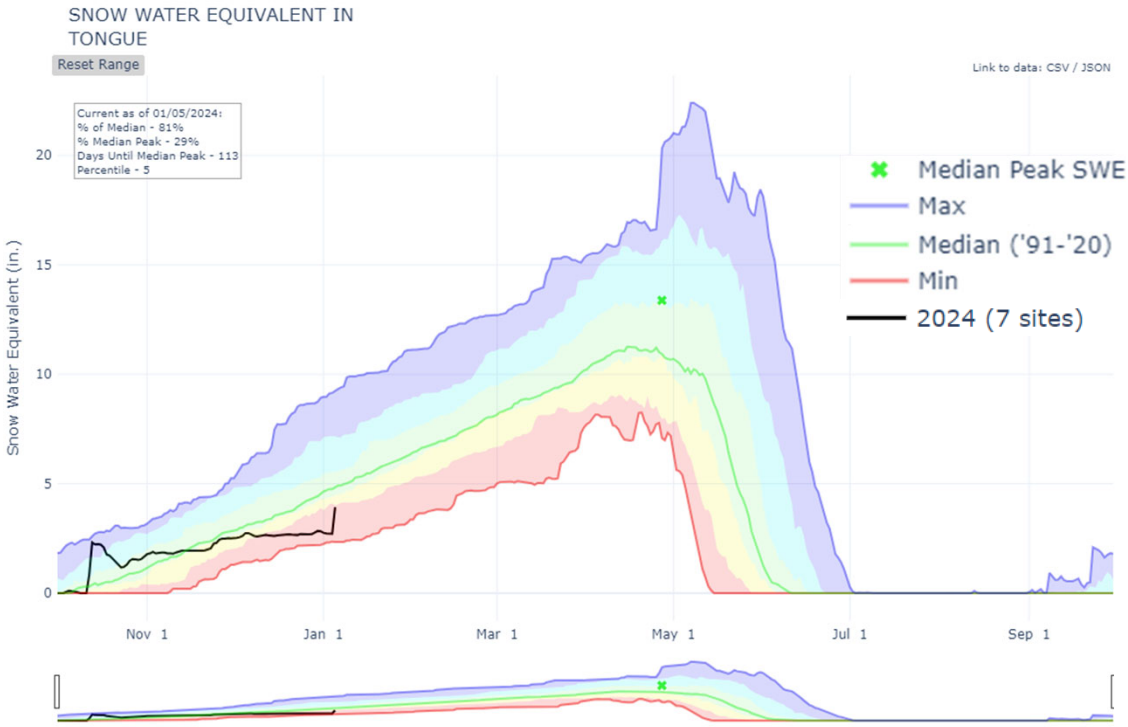
Looking into January, NOAA reports: "Development and intensification of storm systems in the lee of the Rockies is possible. However, January is a very dry time of year for the Great Plains and storm systems are likely to be fast-movers, which will make it difficult to erase long-term precipitation deficits across the Central Plains, in spite of the increased odds of above normal precipitation. Therefore, drought persistence is broadly favored in the Central Plains states, although some targeted areas of improvement and/or removal cannot be ruled out, given the active pattern.."[1]

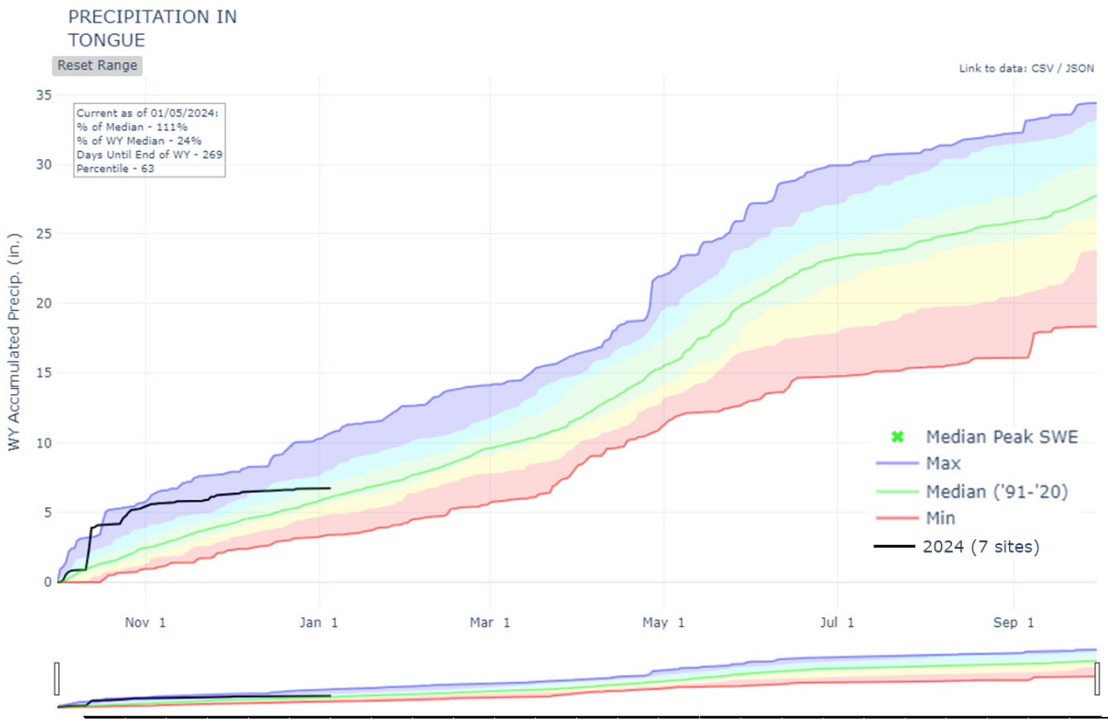


Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
https://www.drought.gov/forecasts
1https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php
https://droughtmonitor.unl.edu/Summary.aspx

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.



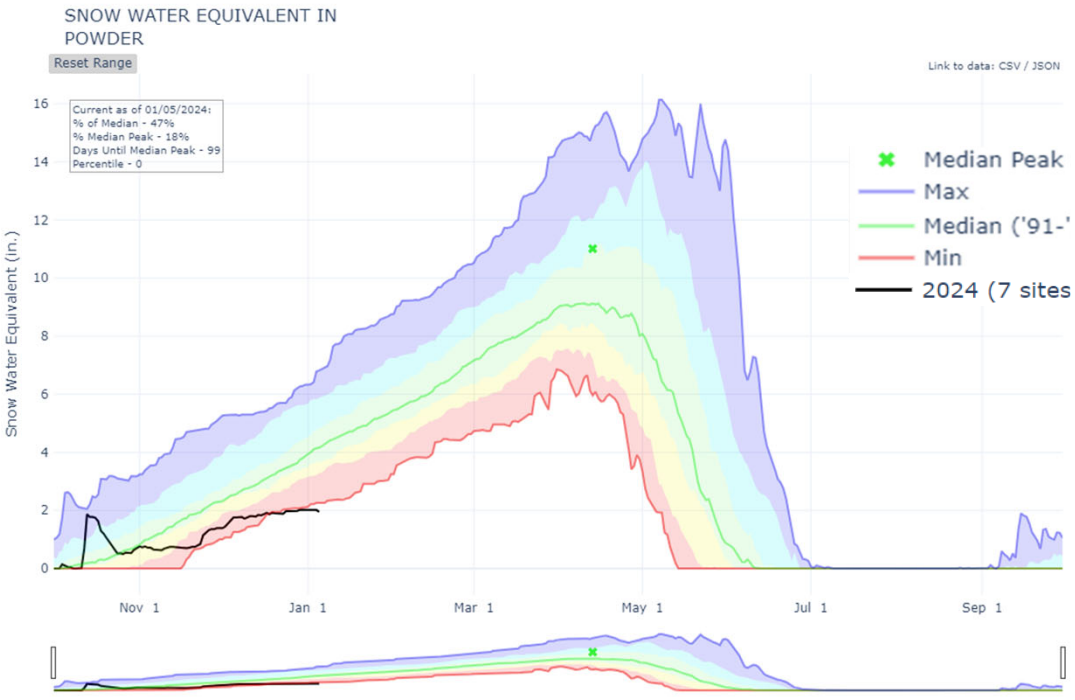


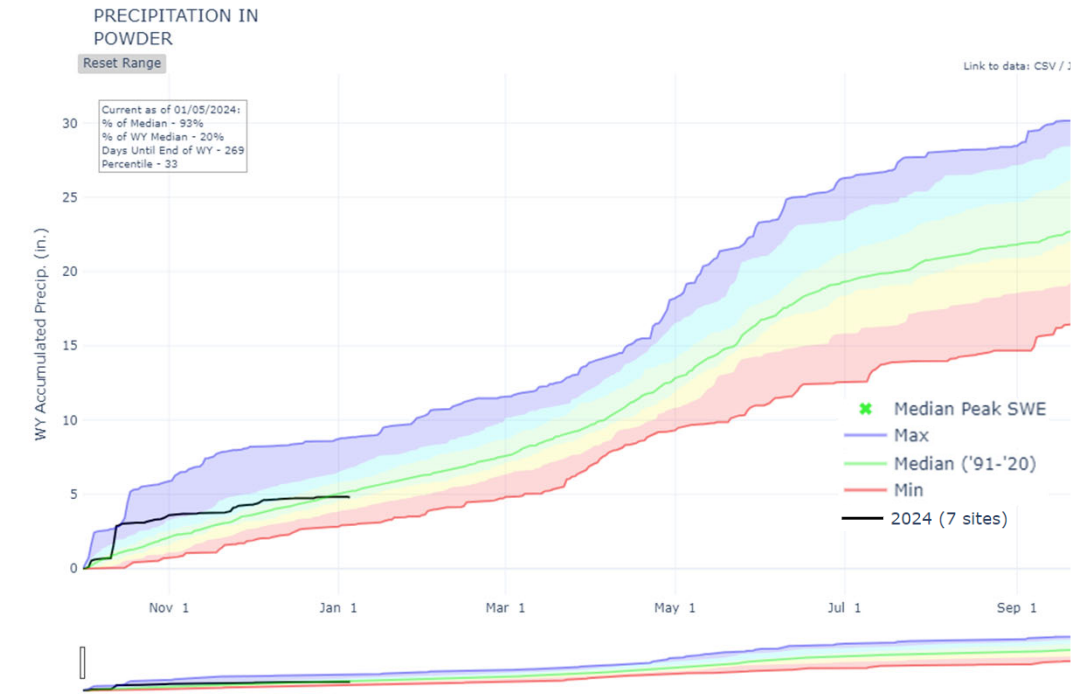
Snow Water Equivalent and Precipitation in Tongue River Watershed: Snow-water equivalent did not increase through December. This is different than the long term trend, which caused snow-water equivalent to drop to the 5th percentile. Meanwhile, precipitation has stayed within the 'normal' range and is currently at the 63rd percentile.

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.





Precipitation in Powder River Watershed: After a few small increases through December, snow water equivalent has not increased as would be normal for the longterm trend and is currently at the 0 percentile. Although drought conditions are not current in the Powder River watershed, this trend does not bode well for spring conditions. However, precipitation remains near-normal for what would usually be expected at this point in the year and is at the 33rd percentile.

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.

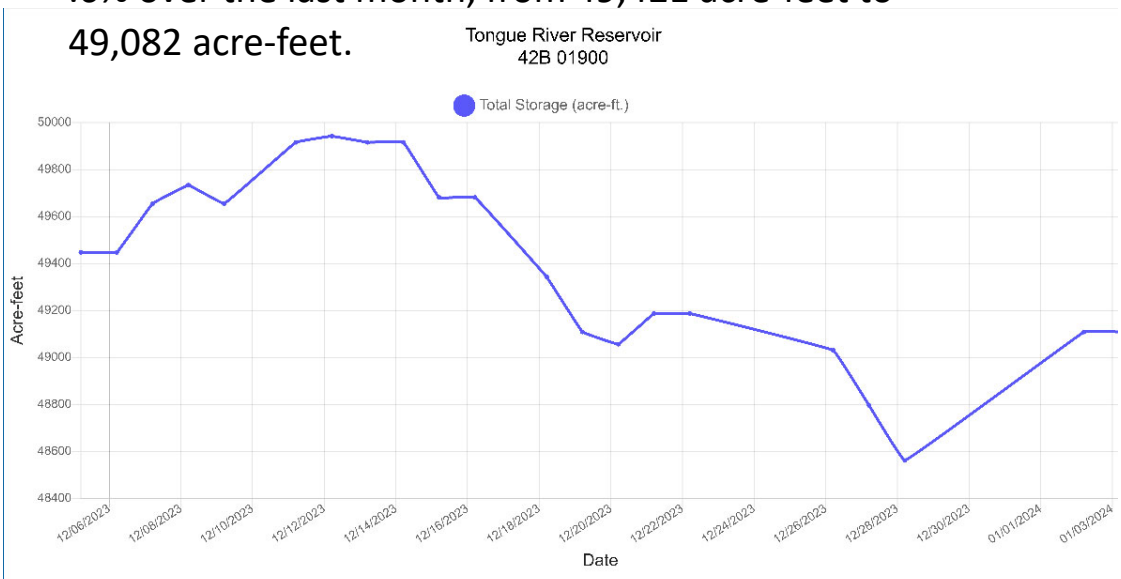
Lake DeSmet

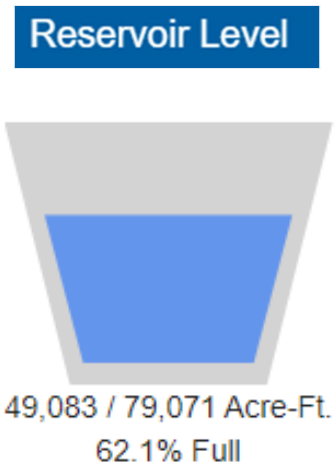
As of January 1, Lake DeSmet has a total of 200,449 acre-feet in storage, a small decrease from December.

Reservoir	Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	2,923	5,756	4,624	50.8
Cross Creek	316	798	798	39.6
Dome Lake No.1	1,324	1,506	1,506	87.9
Kearney Lake	2,975	7,500	6,324	39.7
Park	6,085	12,500	10,362	48.7
Sawmill	943	1,831	1,275	51.5

Tongue River Reservoir

Water levels at Tongue River Reservoir decreased .6% over the last month, from 49,421 acre-feet to 49,082 acre-feet.





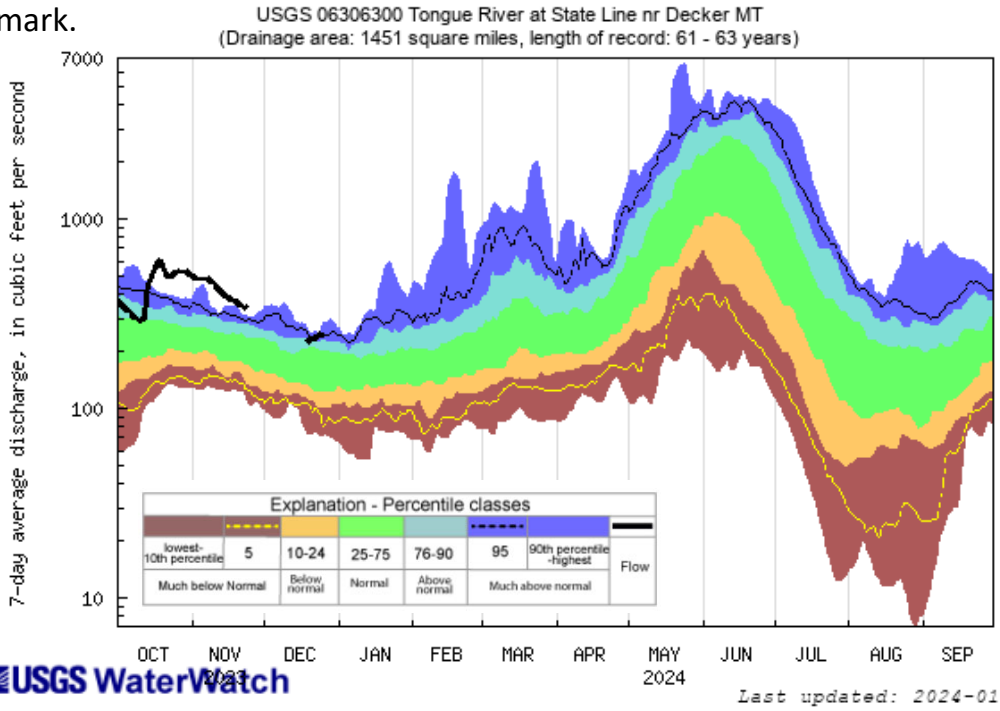
Period of Record: 01/31/1939 - 01/04/2024

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

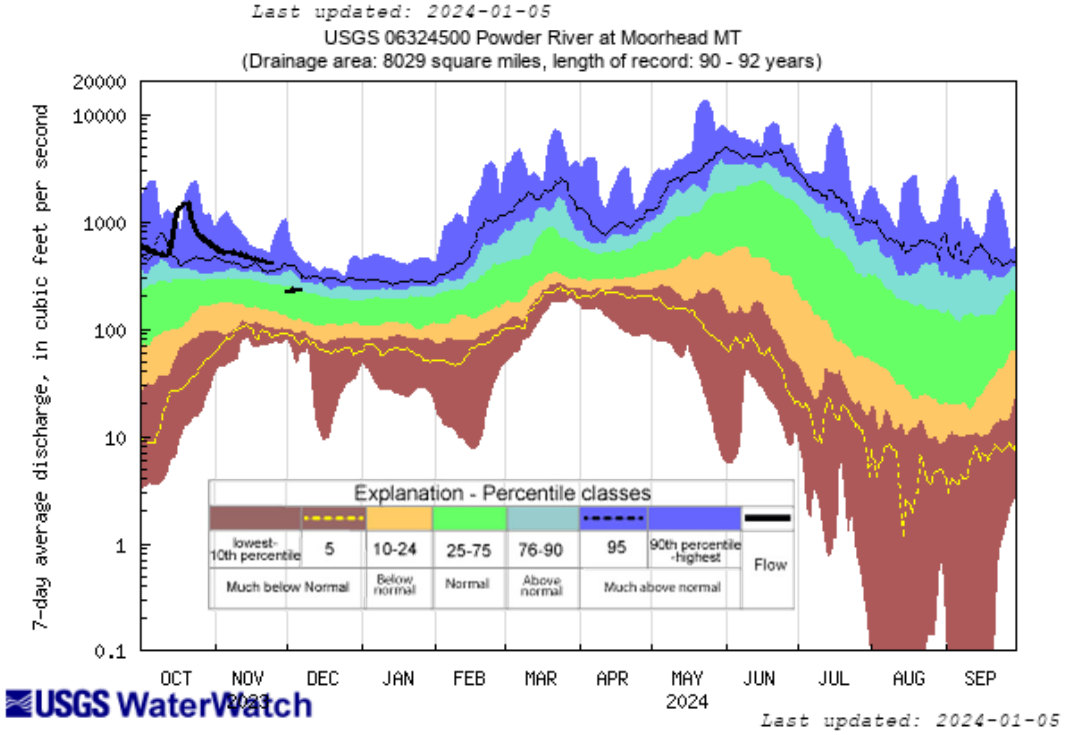
These graphs give context to stream flow percentile classes. The selected USGS stream gauges are on the stateline with Montana, being the downstream end of the Tongue and Powder within our region. The flow represent average 7-day flows. The vertical axis is logarithmic meaning it goes up by 10x for each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



Tongue River Border Station Stream Flow

Streamflow data is not current as of January, but the trend from November shows it decreasing.

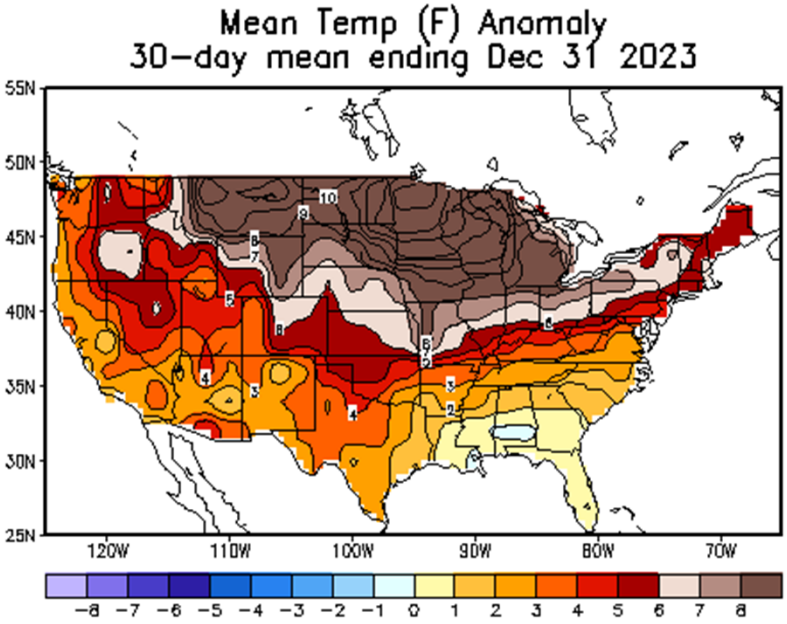
Powder River Border Station Stream Flow: Streamflow data is not current as of January. The last gathered data was at the end of November, which showed a slowly decreasing trend in streamflow.



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

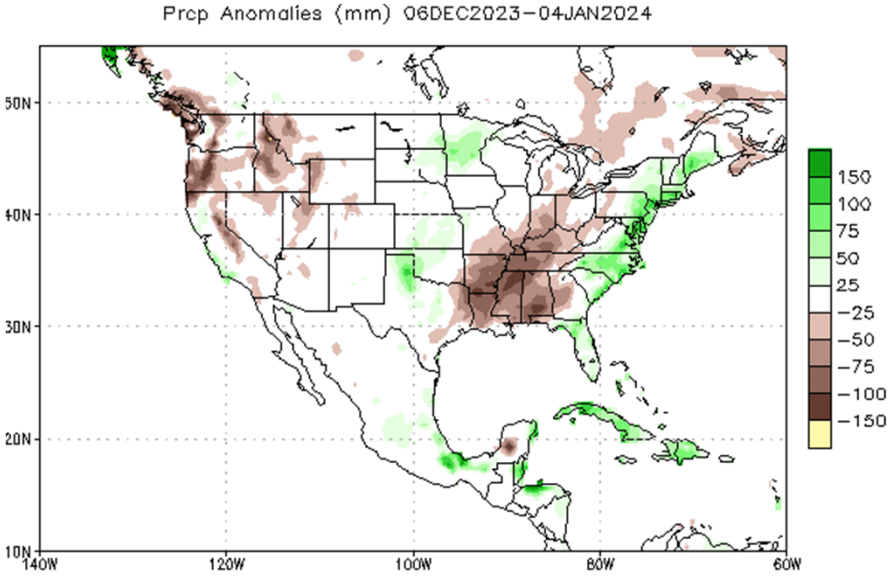
Temperature and Precipitation

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 December was between 30 and 35 degrees, which is up to 8 degrees above average for Sheridan County based on previous years. Multiple days in December were at or near the record high temperature, including December 16th and 20th with high temperatures of 63 and 60 respectively.

Precipitation Anomaly: The precipitation anomaly for most of Sheridan County was between 0 and -25 mm, although the Bighorn Mountains experienced a precipitation anomaly between -25 and -50 mm.

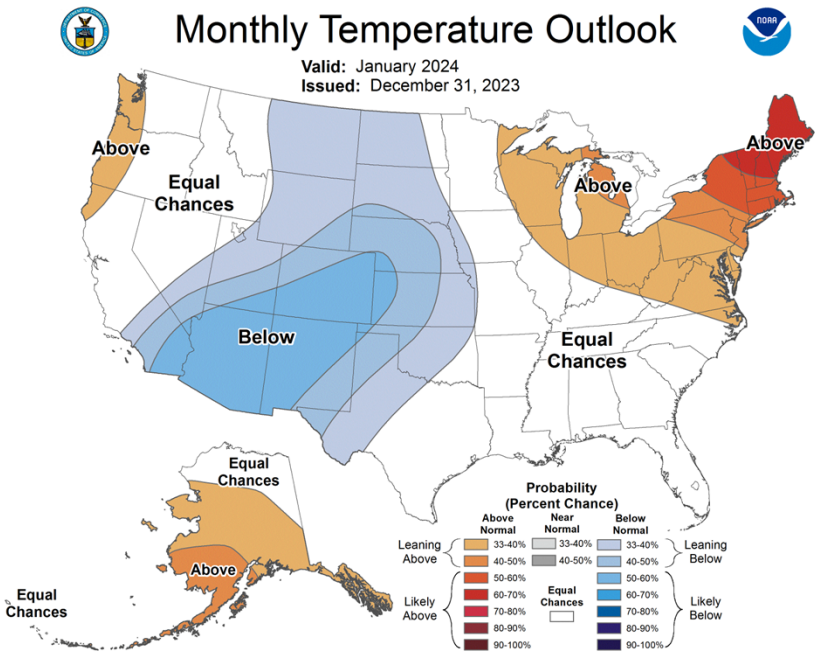


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1991-2020)

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

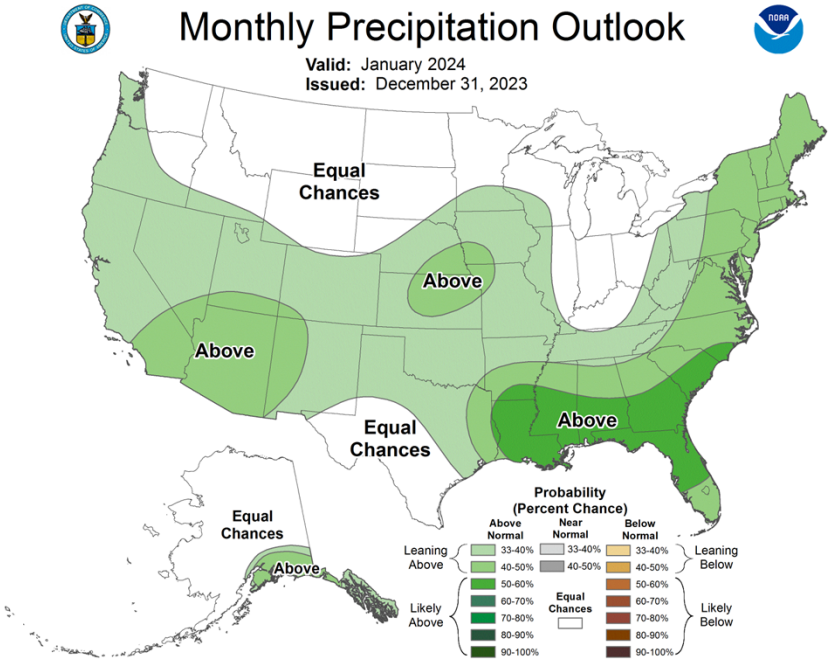
Temperature Forecast and Precipitation Forecast

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 any point in US.



Temperature: Sheridan County has a 33-40% chance for temperatures being below average in January.

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