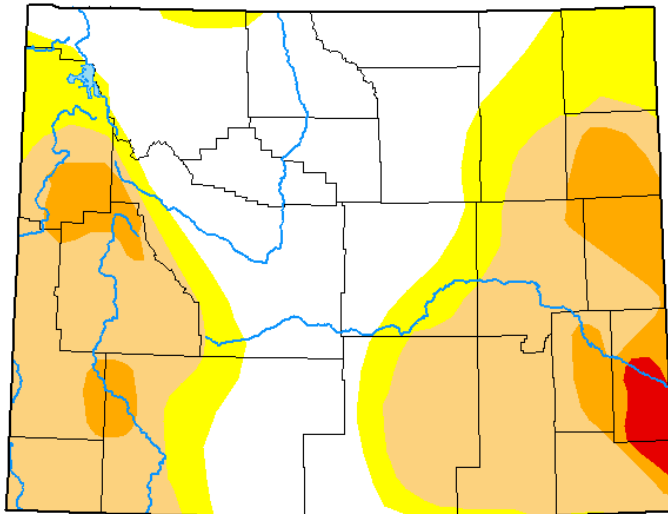


# Sheridan County Water Supply Report

March - 2023

## U.S. Drought Monitor Wyoming

**February 28, 2023**  
(Released Thursday, Mar. 2, 2023)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	39.35	60.65	44.06	9.95	1.29	0.00
<b>Last Week</b> 02-21-2023	36.32	63.68	44.06	9.95	1.29	0.00
<b>3 Months Ago</b> 11-29-2022	25.67	74.33	55.88	28.59	6.45	0.00
<b>Start of Calendar Year</b> 01-03-2023	25.63	74.37	51.30	27.90	6.25	0.00
<b>Start of Water Year</b> 09-27-2022	15.67	84.33	52.52	20.01	3.71	0.00
<b>One Year Ago</b> 03-01-2022	0.00	100.00	97.86	66.82	14.18	0.00

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 Heim  
NCEI/NOAA



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

Compiled for SCLT by Iris Kurz, Undergraduate Research Assistant at University of Wyoming's Haub School. Contact [water@sheridanclt.org](mailto:water@sheridanclt.org) for questions and concerns.

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  
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# How to Use This Report

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## **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.



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# Drought Index and Change

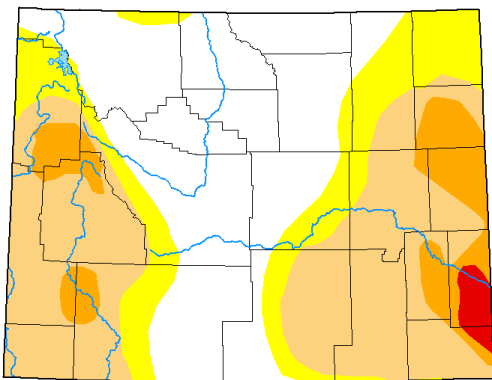
The U.S. Drought Monitor gives you a broad overview of the drought conditions in the US. Its strength is bringing together many ways of determining drought. It is useful as a large-scale view of drought, but local drought resiliency efforts are not considered.

## U.S. Drought Monitor Wyoming

February 28, 2023  
(Released Thursday, Mar. 2, 2023)  
Valid 7 a.m. EST

## Current Drought Monitor:

No portion of Sheridan County is experiencing drought conditions. This is a definite improvement from last month's conditions, as well as a complete change from last year's. Increased precipitation over the past water year has alleviated drought in the county.



**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>

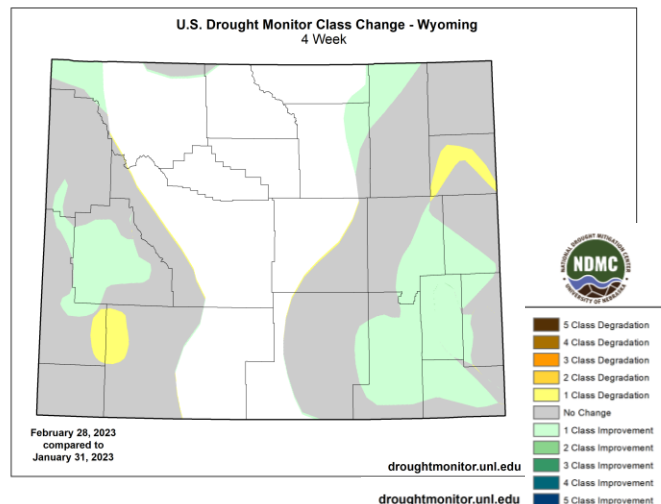
Author:  
Richard Heim  
NCEI/NOAA



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

## Change in Drought Monitor:

Comparing the beginning and end of February, drought in the county has been completely eliminated. The entire county is of drought conditions, including the southeast corner that experienced drought-like conditions last month. Counties to the east and south show signs of drought conditions, but also of continued improvement.



Cooler tones represent improvement. Warmer 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	2023-02-28	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week	2023-02-21	91.56	8.44	0.00	0.00	0.00	0.00	8
3 Months Ago	2022-11-29	93.52	6.48	0.00	0.00	0.00	0.00	6
Start of Calendar Year	2022-12-27	94.99	5.01	0.00	0.00	0.00	0.00	5
Start of Water Year	2022-09-27	49.02	50.98	0.00	0.00	0.00	0.00	51
One Year Ago	2022-03-01	0.00	0.00	0.00	28.30	71.70	0.00	372

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.”

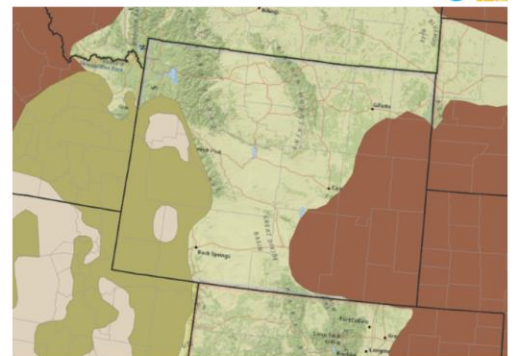
**History of Drought Monitor:** In February of 2022 Sheridan County was experiencing severe - extreme drought conditions (D2-D3), Conditions improved steadily through 2022, especially with the start of the new water year in September, and have steadily improved.

## **Forecast for Drought Monitor:**

“The High Plains region experienced a patchwork pattern of precipitation this week. The Rocky Mountain areas of Wyoming and Colorado, as well as the eastern half of Kansas, received half an inch to locally 2 inches or more of precipitation...**This winter has been particularly wet for central to northern portions of the High Plains region**”<sup>1</sup>

Forecast confidence is low to moderate for the Western and High Plains Regions.

U.S. Monthly Drought Outlook



Base map Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, INCREMENT P

Drought persists  
Drought remains but improves  
Drought removal likely  
Drought development likely  
No drought predicted

The National Weather Service Climate Prediction Center's Monthly Drought Outlook is issued at the end of each calendar month and is valid for the upcoming month. The outlook predicts whether drought will persist, develop, improve, or be removed over the next 30 days or so.

Source(s): Climate Prediction Center  
Updates Monthly - 02/28/23

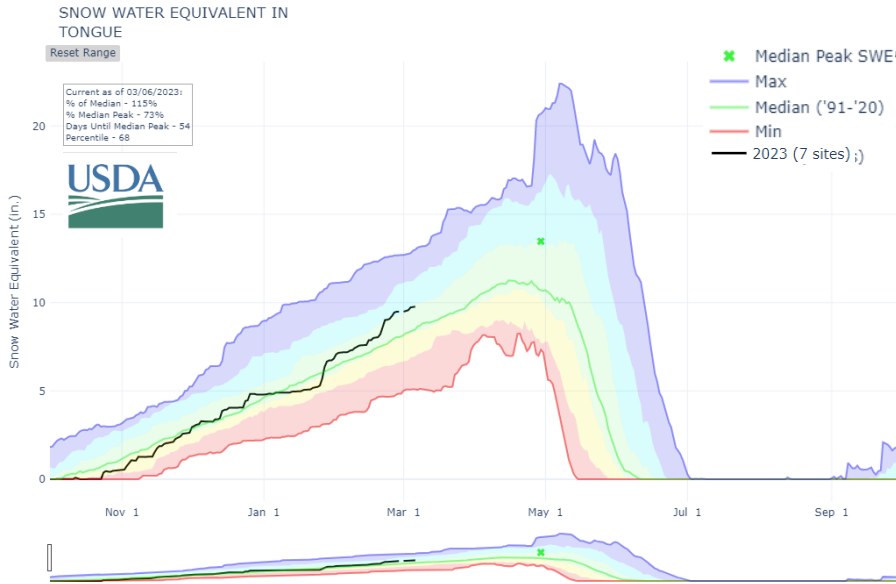
**Drought.gov**

Sources: [https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips\\_56033](https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033)  
<https://www.drought.gov/forecasts>  
<sup>1</sup>[https://www.cpc.ncep.noaa.gov/products/expert\\_assessment/mdo\\_summary.php](https://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.



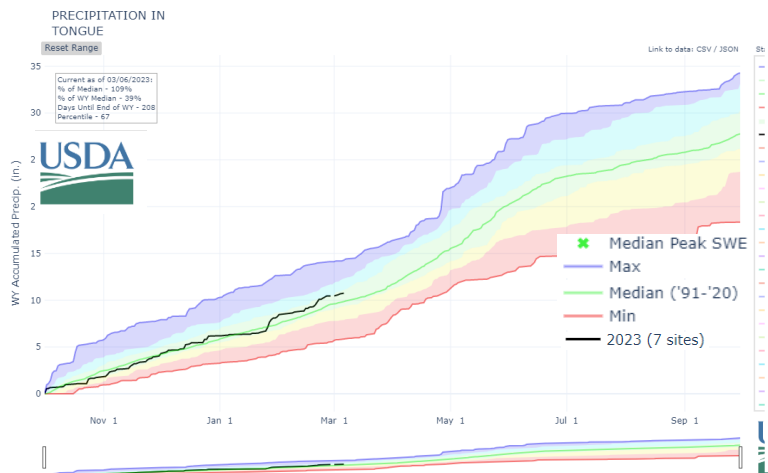
## Snowpack in Tongue River Watershed:

The USDA's water year annually begins on October 1st. February saw a large increase in accumulation of moisture—especially with the large storms that occurred mid-month. Across the watershed there is 9.8 in of SWE, which is 1.3 in above median. Snowpack for the 2023 water year is currently in the 68th percentile.

## Precipitation in Tongue River

### Watershed:

Precipitation in the Bighorn Mountains for the Tongue River watershed increased greatly during the month of February. It is currently 109% of the median which is in the 67th percentile. As of March 6th, the stations have recorded approximately 10.7 inches of precipitation for the water year.



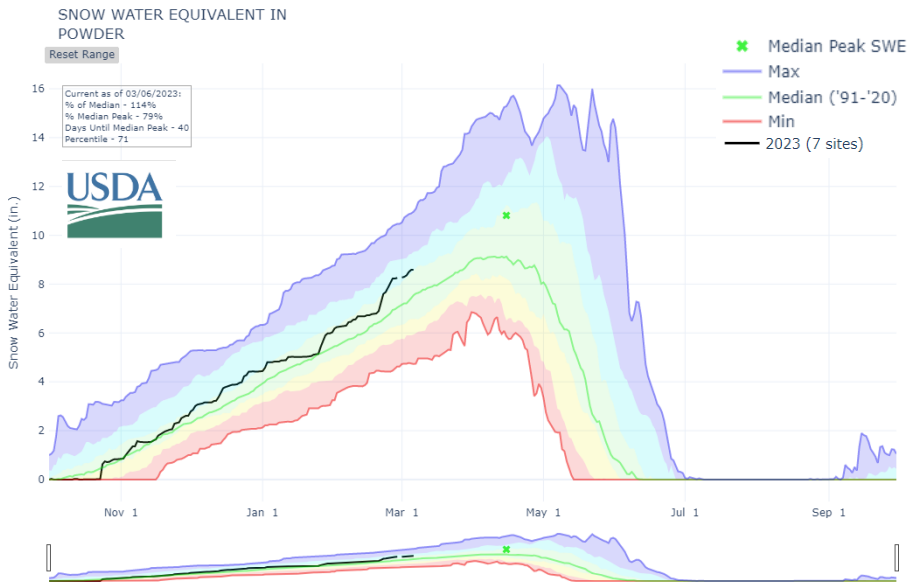
Sources:

[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/WTEQ/assocHUC6/100901_Tongue.html)  
[https://www.nrcs.usda.gov/Internet/WCIS/AWS\\_PLOTS/basinCharts/POR/PREC/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.

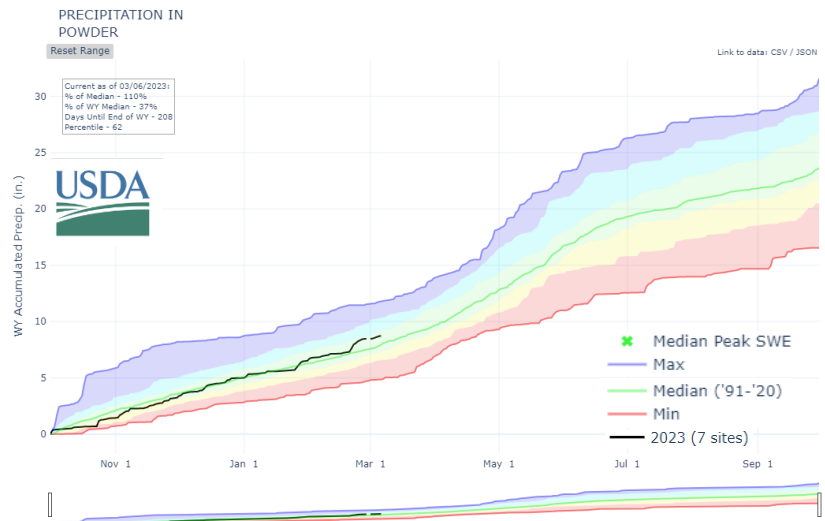


## Snowpack in Powder River Watershed:

The Powder River watershed has accumulated approximately 8.6 in. of snowpack as of January 1st, leaving the overall at 114% of the median snowpack for this time of year, and in the 71st percentile compared to previous years.

## Precipitation in Powder River

**Watershed:** Precipitation in the Bighorn Mountains for the Powder River watershed is now greatly above median following a drier January. It is currently 110% of median which is in the 62nd percentile. As of March 6th, the stations have recorded close to 8.7 inches of precipitation.



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/WTEQ/assocHUC6/100902_Powder.html)

[https://www.nrcs.usda.gov/Internet/WCIS/AWS\\_PLOTS/basinCharts/POR/PREC/assocHUC6/100902\\_Powder.html](https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/100902_Powder.html)



# Reservoir Capacity & 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

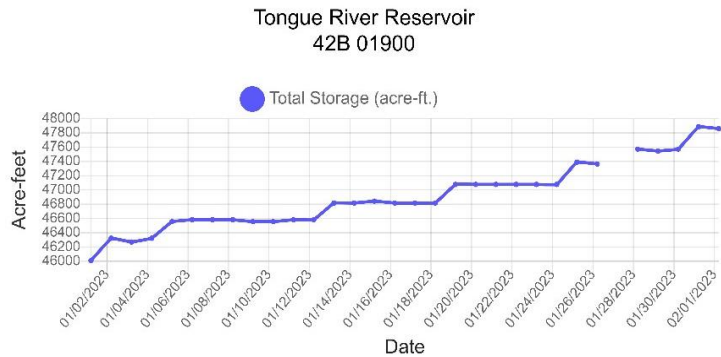
As of March 1st, 2023, Lake DeSmet has 197,911 A.F. in storage, which is 84% of its total capacity.

Reservoir	Current Storage (Acre-ft)	Total Storage (Acre-ft)	Total Storage (%)
Bighorn	2,036	5,756	35.37%
Cross Creek	0	798	0.00%
Dome Lake No.1	1,355	2,030	66.74%
Kearney Lake	1,547	7,500	20.63%
Park	3,332	12,500	26.66%
Sawmill	830	1,831	45.33%

## Winter Watersheds

As winter progresses, it is important to note that many of the tools used to obtain storage and elevation data will be obstructed by ice. This forces management groups to rely on provisional data (which is based off the last accurate reading) in order to predict the current levels in various reservoirs. Such is the case for all the reservoirs in the above table and the Tongue

River Dam. As these datasets are provisionally approved, it is important to use the data skeptically—while it could be accurate, it could also not be.



47,859 / 79,071 Acre-Ft.  
60.5% Full

Sources:

Lake DeSmet Operating Department at [lakedesmet@johnsoncowy.us](mailto:lakedesmet@johnsoncowy.us)

<https://seoflow.wyo.gov/Data/Map/Parameter/Total%20Storage/Location/Identifier/Interval/Latest>

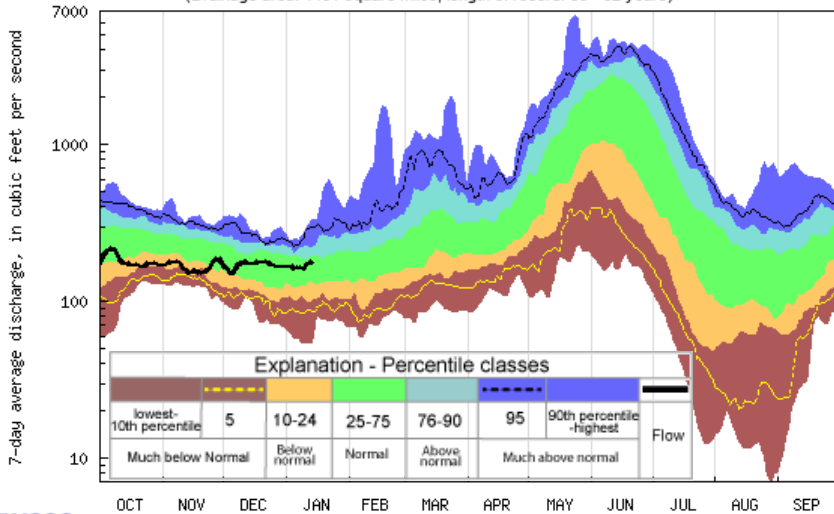
<https://gis.dnrc.mt.gov/apps/StAGE/>



# Select Stream Flow Stations

These graphs give context to stream flow percentile classes. The selected USGS stream gauges are on the stateliness 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.

USGS 06306300 Tongue River at State Line nr Decker MT  
(Drainage area: 1451 square miles, length of record: 60 - 62 years)



USGS WaterWatch

Last updated: 2023-03-06

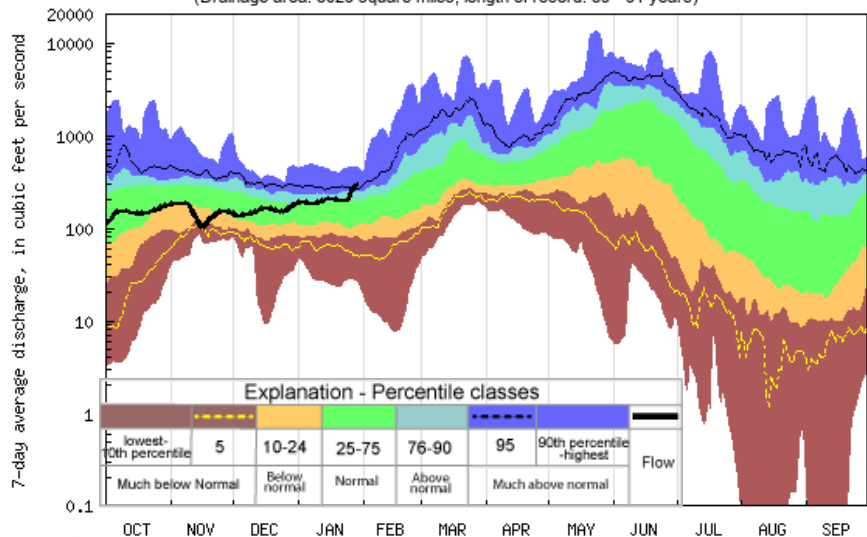
## Tongue River Border Station

**Stream Flow:** Likely due to winter weather conditions affecting the efficacy of measurement tools, the streamflow of the Tongue River has not been updated since mid-January. Given recent weather patterns, however, it is safe to assume that streamflows are similar to—if not increased from—last month.

## Powder River Border Station

**Stream Flow:** Likely due to winter weather conditions affecting the efficacy of measurement tools, the streamflow of the Powder River has not been updated since the beginning of February. Given recent weather patterns, however, it is safe to assume that streamflows are similar to—if not increased from—last month.

USGS 06324500 Powder River at Moorhead MT  
(Drainage area: 8029 square miles, length of record: 89 - 91 years)



USGS WaterWatch

Last updated: 2023-03-06

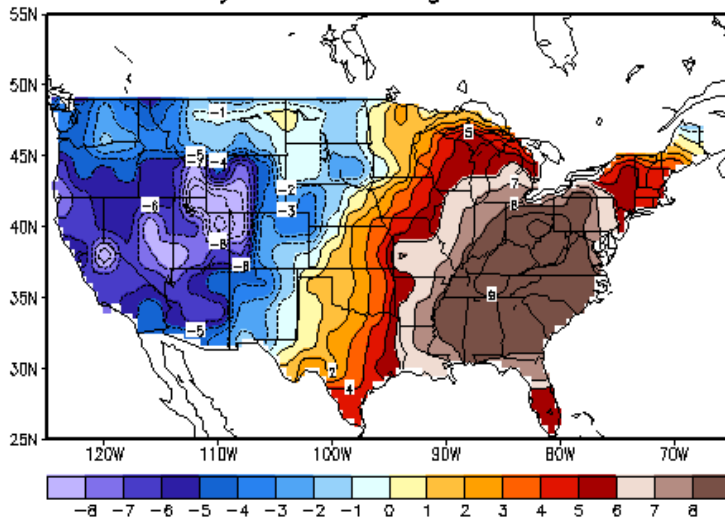
Sources: <https://waterwatch.usgs.gov/index.php?id=mv01d>  
[https://waterwatch.usgs.gov/?id=wwchart\\_sitedur&ofmt=plot\\_mvbg&site\\_no=06306300](https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300)  
[https://waterwatch.usgs.gov/?id=wwchart\\_sitedur&ofmt=plot\\_mvbg&site\\_no=06324500](https://waterwatch.usgs.gov/?id=wwchart_sitedur&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.

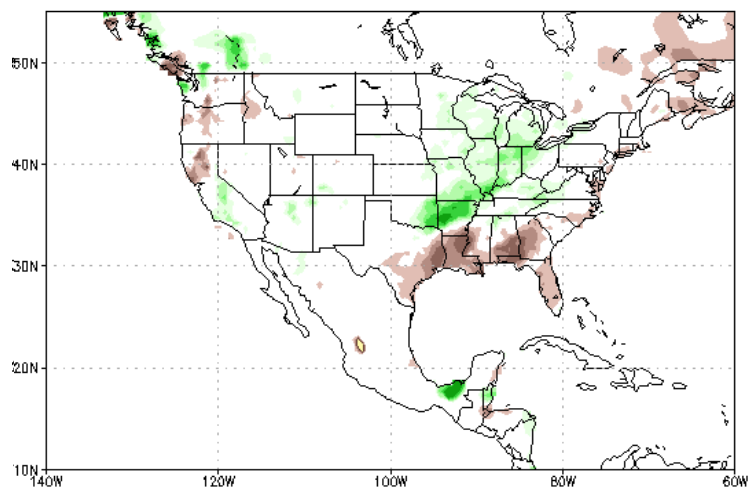
Mean Temp (F) Anomaly  
30-day mean ending Mar 05 2023



**Temperature Anomaly:** In February, the average temperature was 4-5°F lower than what we generally see in Sheridan County.

**Precipitation:** The rainfall for February in Sheridan County was within 25 mm (~1 inch) of what is average. Monthly precipitation has stayed consistent with the last month's patterns, and a slight increase from January has alleviated the forming drought conditions.

Prep Anomalies (mm) 04FEB2023-05MAR2023



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/tanal/temp_analyses.php)  
[https://www.cpc.ncep.noaa.gov/products/Global\\_Monsoons/American\\_Monsoons/NAMS\\_precip\\_monitoring.shtml](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](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](https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php)

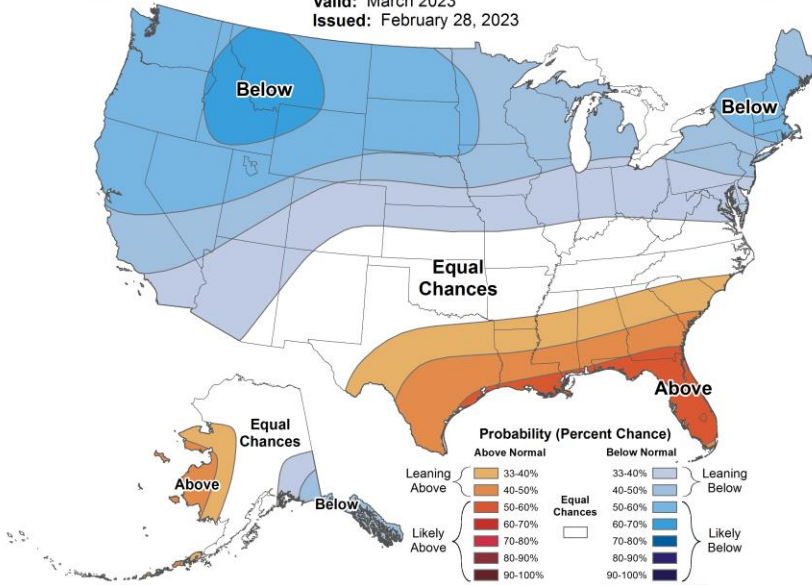
Explore link above for an Interactive map that displays percentage chance above and below normal for any point in US.



## Monthly Temperature Outlook



Valid: March 2023  
Issued: February 28, 2023



**Temperature:** Sheridan County has a 50-60% of seeing temperatures below average for the month of February.

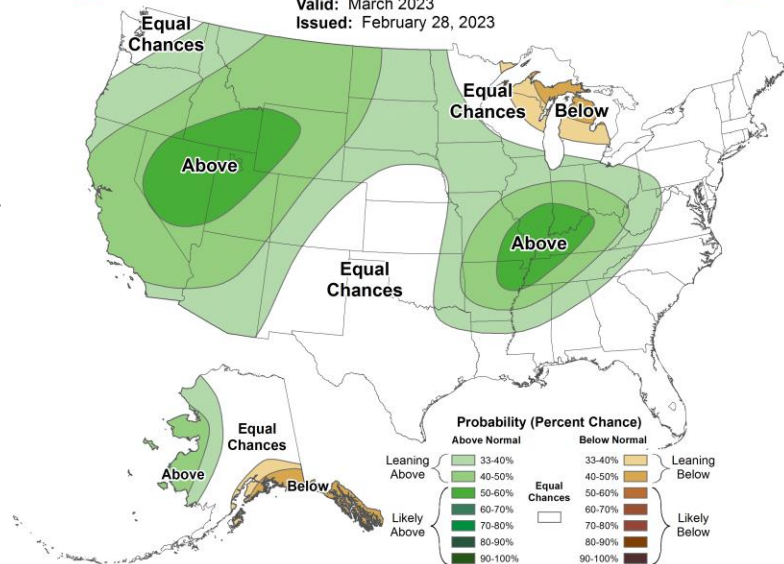
**Precipitation:** Sheridan County has 40-50% chances of seeing precipitation rates above average for the following month.



## Monthly Precipitation Outlook



Valid: March 2023  
Issued: February 28, 2023



Sources: <https://www.cpc.ncep.noaa.gov/>  
[https://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/lead14/interactive/index.php](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](https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php)



# Vegetation Drought Response and Soil Moisture

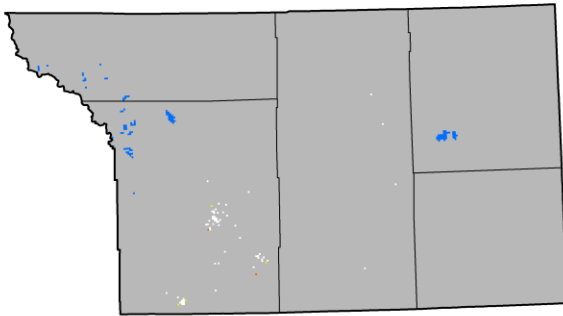
The graphs below are two ways of visualizing on-ground conditions. The vegetation Drought Response Index (Vegdri) uses a satellite to estimate vegetative stress. Soil moisture is helpful when looking at many things. Soil acts as a bank for moisture and can buffer drought degradation or improvement. It is also the water that plants have available to them so is linked to vegetative stress.

## Vegetation Drought Response Index Complete: Wyoming, Region 2

March 5, 2023

### Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water



## Vegetation Drought Response:

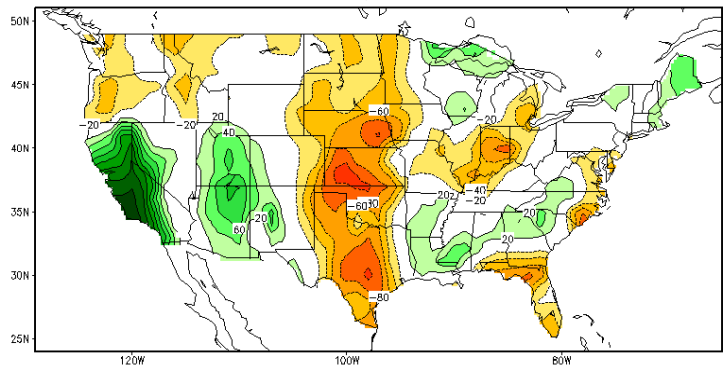
The Vegetation Drought Response Index shows that all of the county's vegetation is now out-of-season.



## Soil Moisture:

Soil moisture is normal in Sheridan County, a constant from last month, but eastern Wyoming is currently experiencing lowered soil moisture. Soil conditions to the west and north have stayed constant.

Calculated Soil Moisture Anomaly (mm)  
FEB, 2023



Sources: <https://vegdiri.unl.edu/Home/VegDRIQuad.aspx?WY,2>  
[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml)

