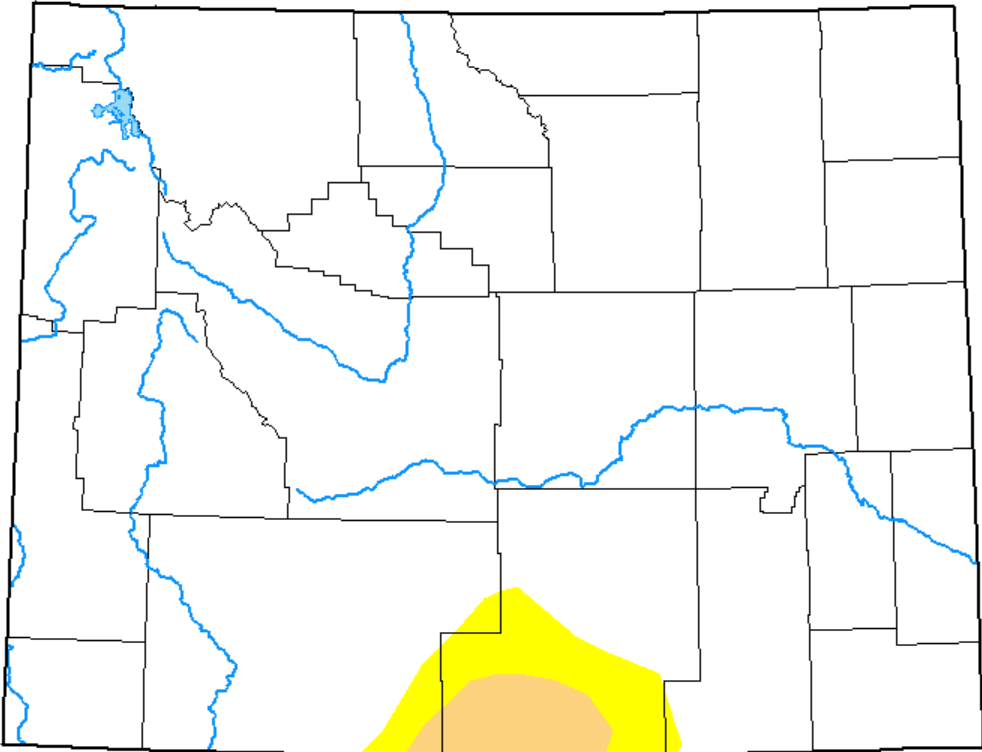


# Sheridan County Water Supply Report

November - 2023

## U.S. Drought Monitor Wyoming

**October 31, 2023**  
(Released Thursday, Nov. 2, 2023)  
Valid 8 a.m. EDT



**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](https://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

---

Information	Page
<a href="#"><u>Highlight of the month</u></a>	4
<a href="#"><u>Drought Index and Change</u></a>	5
<a href="#"><u>Drought History and Forecast</u></a>	6
<a href="#"><u>Precipitation - Tongue River</u></a>	7
<a href="#"><u>Precipitation - Powder River</u></a>	8
<a href="#"><u>Stream Flow and Reservoirs</u></a>	9
<a href="#"><u>Select Stream Flow Stations</u></a>	10
<a href="#"><u>Water Supply Forecast-Tongue River Basin</u></a>	11
<a href="#"><u>Water Supply Forecast- Powder River Basin</u></a>	12
<a href="#"><u>Temperature and Precipitation</u></a>	13
<a href="#"><u>Temperature and Precipitation Forecasts</u></a>	14
<a href="#"><u>Vegetation Drought Response and Soil Moisture</u></a>	15





# Highlight of the Month

---

## A Big Thank You to Rebecca Ash!

The end of October marked the end-of-term for our summer intern, Rebecca Ash. Rebecca spent six months with SCLT, moving the needle forward with our water projects by contacting landowners and surveying properties for sites that have been affected by erosion and head-cutting. She then put together proposals for these landowners identifying what low-tech structures could fix these issues to restore the watershed and improve habitat for wildlife and forage quality for cattle. By the end of October, Rebecca had identified 100 sites, and led a volunteer project with First Interstate Bank to install Zeedyk structures at the Hidden Hoot trail system.

Rebecca is now off to bigger and better things- in addition to working for SCLT, she has been building her bread-baking company in Sheridan and plans to pursue her Bachelor's degree in Ag Business. Thank you, Rebecca, for your persistence and enthusiasm and we can't wait to see what you do next!

MKO



# Drought Index and Change

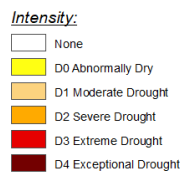
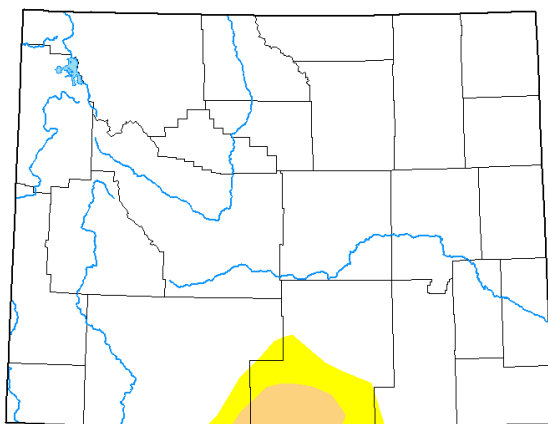
The U.S. Drought Monitor gives you a broad overview of the drought conditions in the US. Its strength is bringing together many ways of determining drought. It is useful as a large-scale view of drought, but local drought resiliency efforts are not considered.

## U.S. Drought Monitor Wyoming

October 31, 2023  
(Released Thursday, Nov. 2, 2023)  
Valid 8 a.m. EDT

### Current Drought Monitor:

Just like last month, no portion of Sheridan County is experiencing drought conditions. Nearly all of Wyoming is enjoying drought-free conditions, but drier conditions over the last month on the southern side of the state have caused drought to creep into Carbon and Sweetwater county.



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>

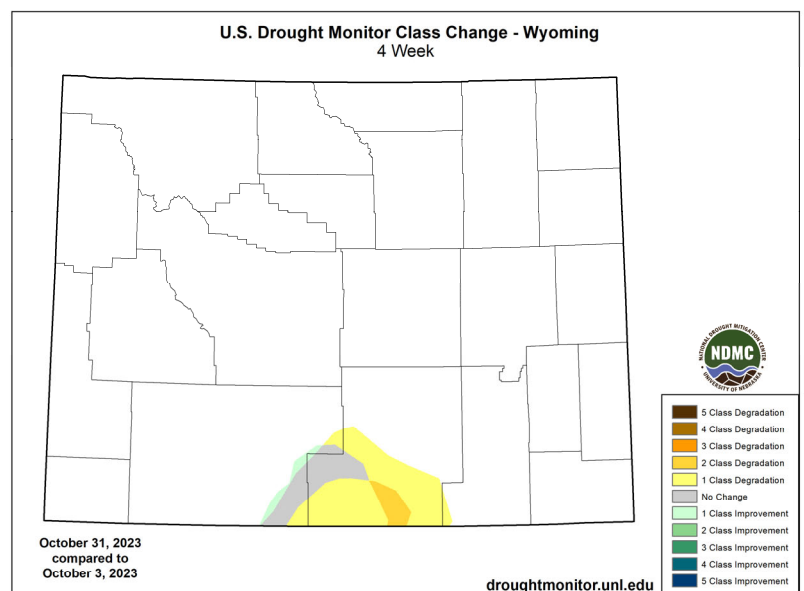
**Author:**  
Brian Fuchs  
National Drought Mitigation Center



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

### Change in Drought Monitor:

There has been no change in drought conditions for Sheridan County. Compared to the beginning of October, drought conditions in Carbon County have intensified but not severely. Sweetwater county has enjoyed a slight improvement in drought conditions. Temperatures across the state were colder than average for October, which likely contributed to the persistence of drought-free conditions.



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	<a href="#">2023-10-31</a>	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week to Current	<a href="#">2023-10-24</a>	100.00	0.00	0.00	0.00	0.00	0.00	0
3 Months Ago to Current	<a href="#">2023-08-01</a>	100.00	0.00	0.00	0.00	0.00	0.00	0
Start of Calendar Year to Current	<a href="#">2022-12-27</a>	94.99	5.01	0.00	0.00	0.00	0.00	5
Start of Water Year to Current	<a href="#">2023-09-26</a>	100.00	0.00	0.00	0.00	0.00	0.00	0
One Year Ago to Current	<a href="#">2022-11-01</a>	62.25	37.75	0.00	0.00	0.00	0.00	38

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 November of 2022, 37.75% of Sheridan County was experiencing abnormally dry conditions (D0). By the start of the calendar year, only 5% of the county was experiencing these abnormally dry conditions. Conditions over the summer held steady as Sheridan County continued to stay drought-free.

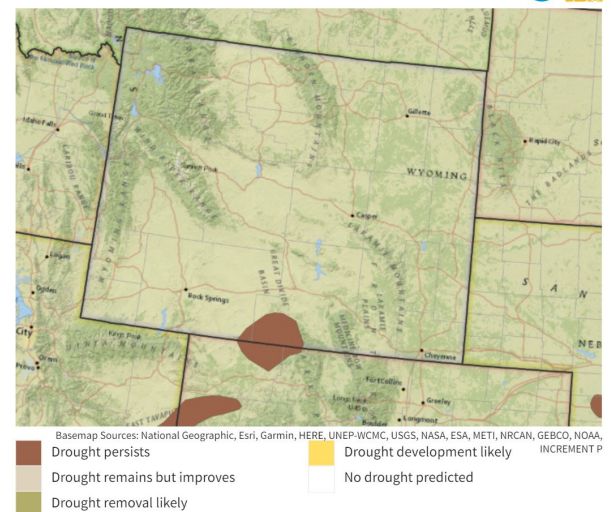
### **Forecast for Drought Monitor:**

Looking into November, NOAA reports: “The West is beginning the 2023-2024 water year with its lowest drought coverage since 2019.”<sup>1</sup>

NOAA forecasts a 50% chance for above-normal precipitation across the western region, and does not forecast significant change in conditions for the High Plains region. Wyoming is situated on the boundary between these two regions.

Forecast confidence is high for the Western and High Plains regions.

U.S. Monthly Drought Outlook



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

Source(s): Climate Prediction Center

Updates Monthly: 10/31/23

[Drought.gov](https://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>

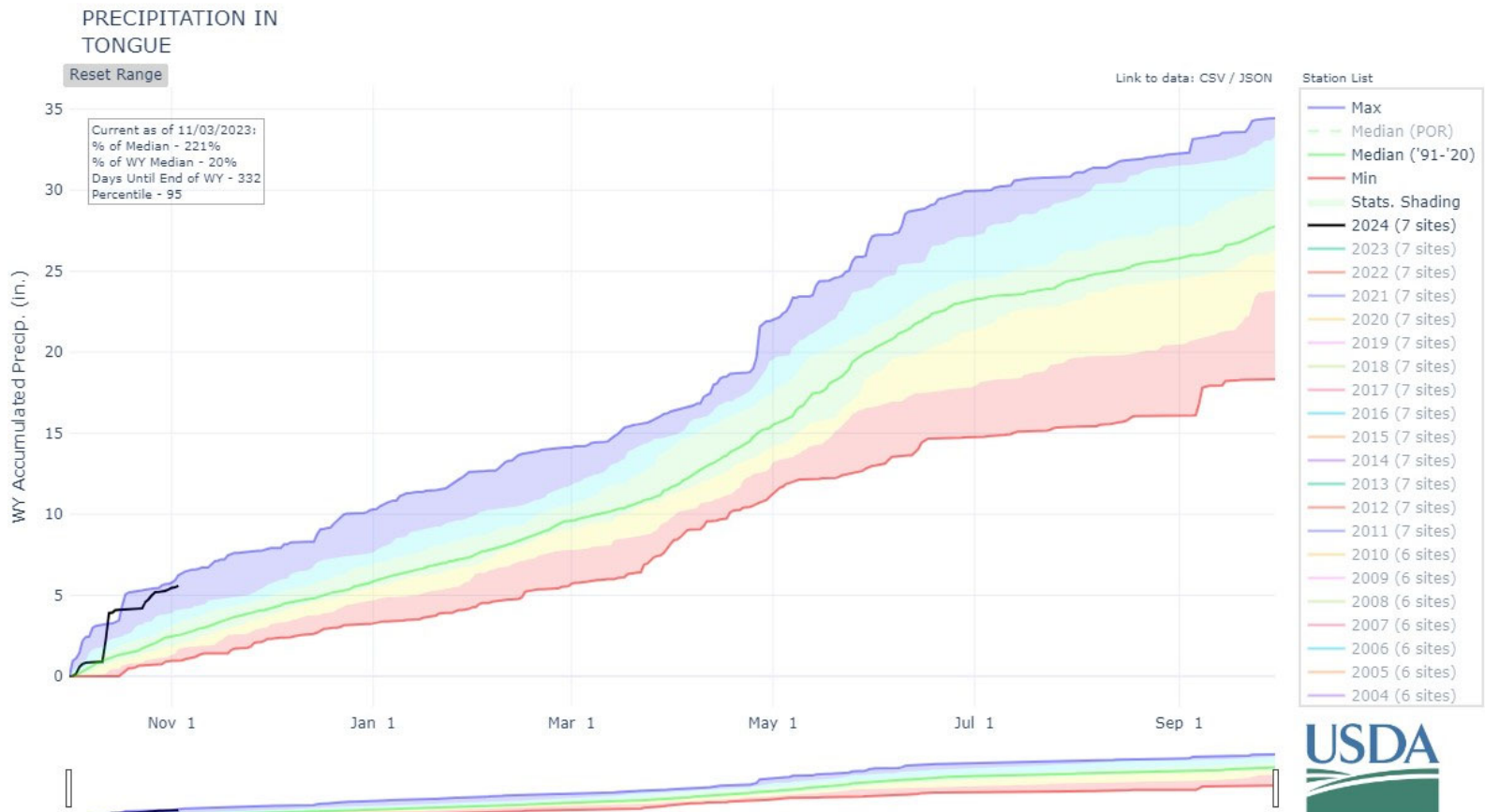
[https://www.cpc.ncep.noaa.gov/products/expert\\_assessment/mdo\\_summary.php](https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php)

<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.



**Precipitation in Tongue River Watershed:** Precipitation in the Tongue River Water Shed is trending high. We have experienced a significant increase, going from the 53<sup>rd</sup> percentile last month to the 95<sup>th</sup> percentile this month **MK0**. Precipitation for the Tongue River watershed is currently 221% of median.

Sources:

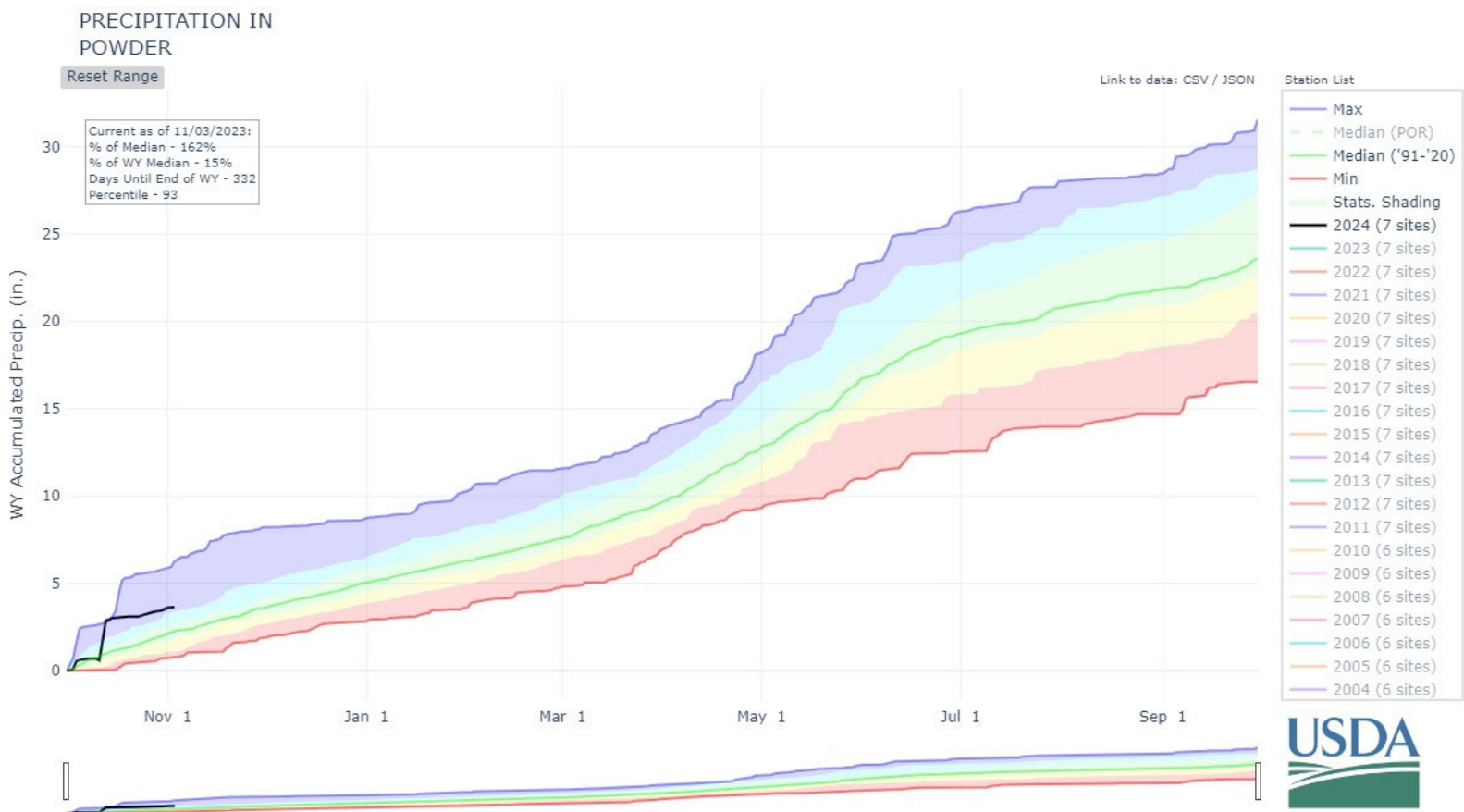
[https://www.nrcs.usda.gov/Internet/WCIS/AWS\\_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100901\\_Tongue.html](https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100901_Tongue.html)

[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.



**Precipitation in Powder River Watershed:** Precipitation in the Powder River watershed also increased significantly over the last month, moving from the 21<sup>st</sup> percentile to the 93<sup>rd</sup> percentile. Precipitation is currently 162% of median. MKO

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 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.

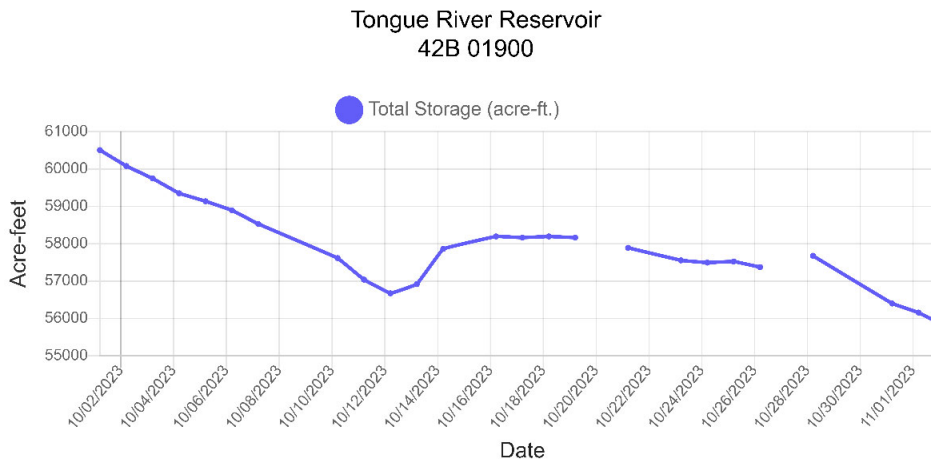
## Lake DeSmet

As of November 1, Lake DeSmet has a total of 201,426 acre-feet in storage, which is 86% of its total capacity.

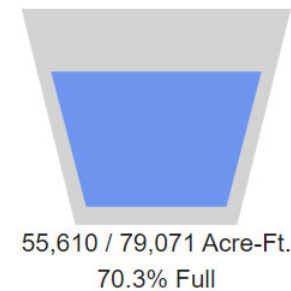
Reservoir	Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	2,179	5,756	4,624	37.9
Cross Creek	647	798	798	81.1
Dome Lake No.1	1,468	1,506	1,506	97.5
Kearney Lake	2,434	7,500	6,324	32.5
Park	6,085	12,500	10,362	48.7
Sawmill	900	1,831	1,275	49.2

## Tongue River Reservoir

Water levels at Tongue River Reservoir decreased 7.5% over the last month, from 60,094 acre-feet to 55,610 acre-feet.



### Reservoir Level



Period of Record: 01/31/1939 - 11/03/2023

This graph displays the real time data of the Tongue 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.

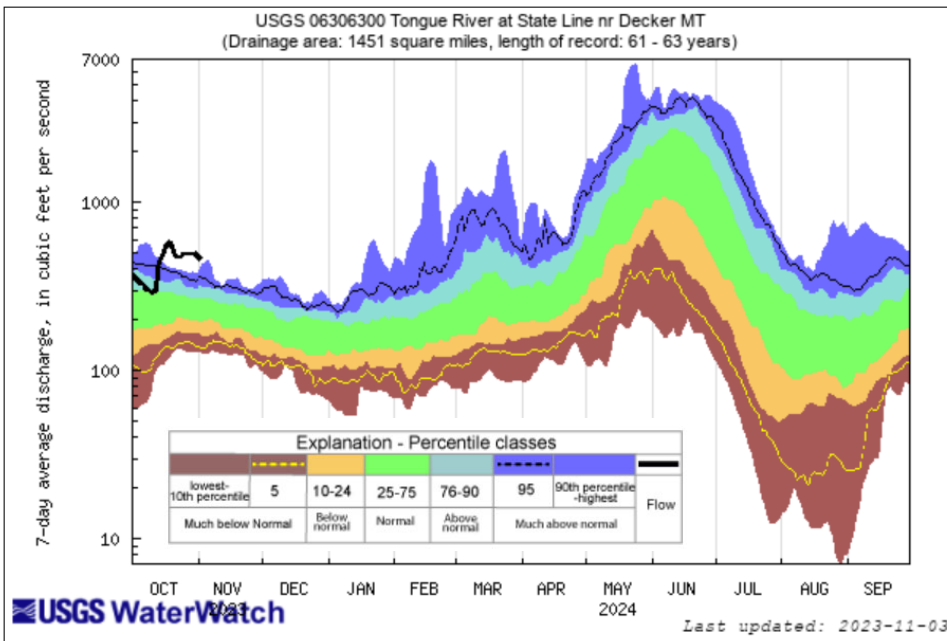
#### Sources:

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

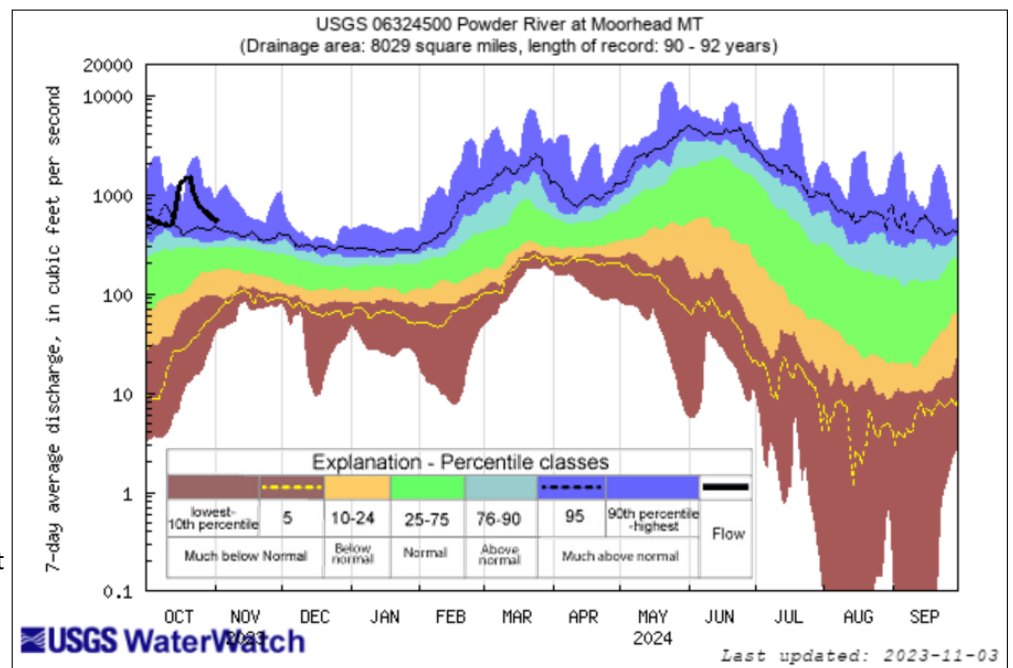


## Tongue River Border Station

**Stream Flow:** The average flow for the month of October was reported at approximately 470 cfs. This amount is high for this time of year. At the time of this report, we have exceeded the 95<sup>th</sup> percentile for flow in November. Our current flow rate would be considered within the normal range for early to mid May.

## Powder River Border Station

**Stream Flow:** Average flow in October was reported at approximately 800 cfs. This is high for this time of year, and well above the 95<sup>th</sup> percentile for flow for November. Peak flow in mid-October would be considered comparable to above-normal flow in June. Current flow as of November 1<sup>st</sup> is comparable to normal flow in May to early July.

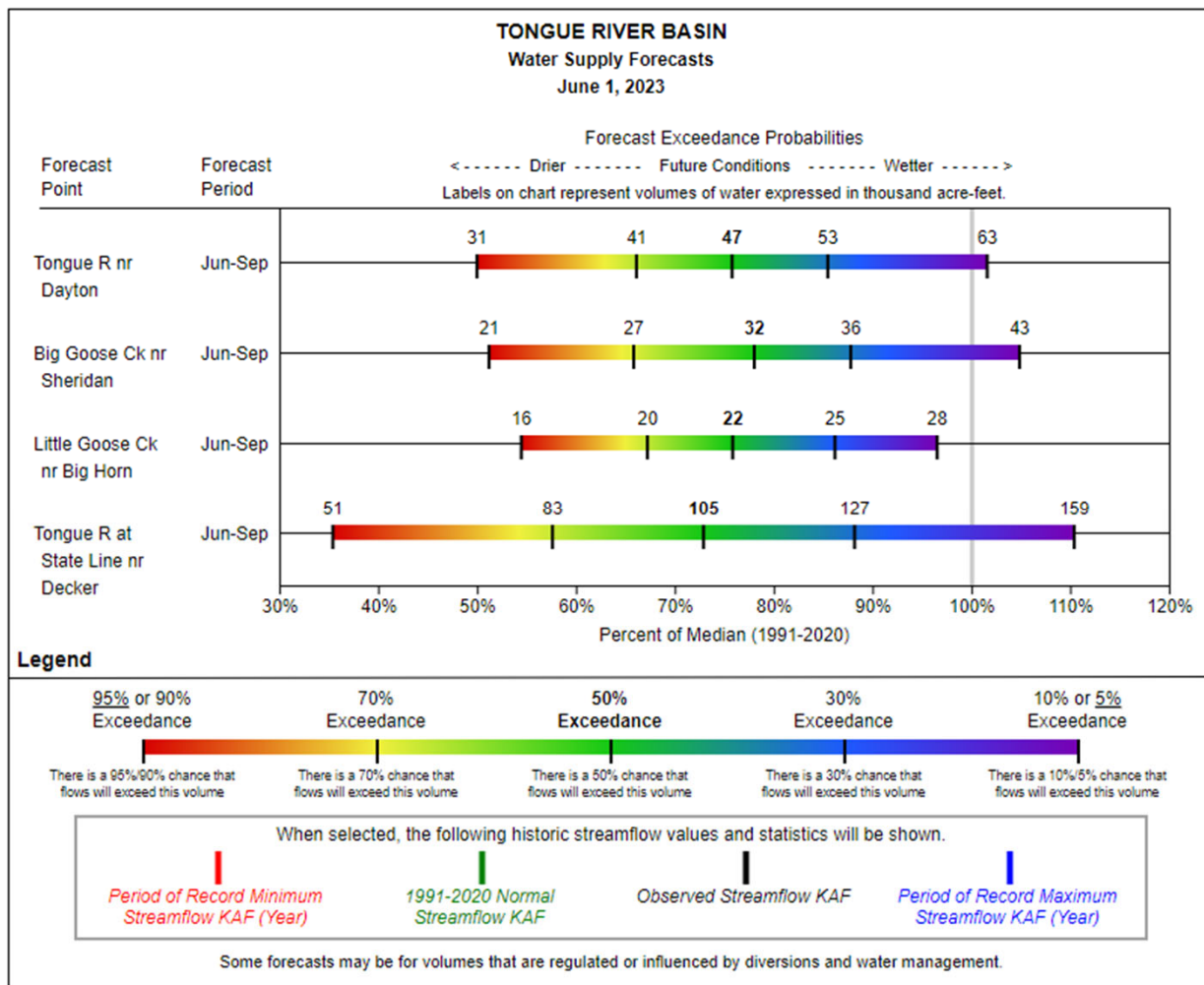


Sources: <https://waterwatch.usgs.gov/index.php?id=mv01d>  
[https://waterwatch.usgs.gov/?id=wwchart\\_sitedur&ofmt=plot\\_mvbg&site\\_no=06306300](https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300)  
[https://waterwatch.usgs.gov/?id=wwchart\\_sitedur&ofmt=plot\\_mvbg&site\\_no=06324500](https://waterwatch.usgs.gov/?id=wwchart_sited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



# Tongue Water Supply Forecast

This chart takes a while to understand but take your time to look at the axes and the legend. It holds valuable information. The exceed value is percent chance that flows exceed will exceed a given volume. For instance, 90% exceedance means there is a 90% chance it will be above and a 10% chance it will be below.



**Tongue River Water Supply:** This chart was last updated in June, but includes the predicted water supply forecast for July through September. In the Tongue River watershed, based on the Jun-Sept forecast, we are likely to see at least 75% of median. Based on this forecast, there is only a 5-10% chance we will be above median.

MK0

Sources:

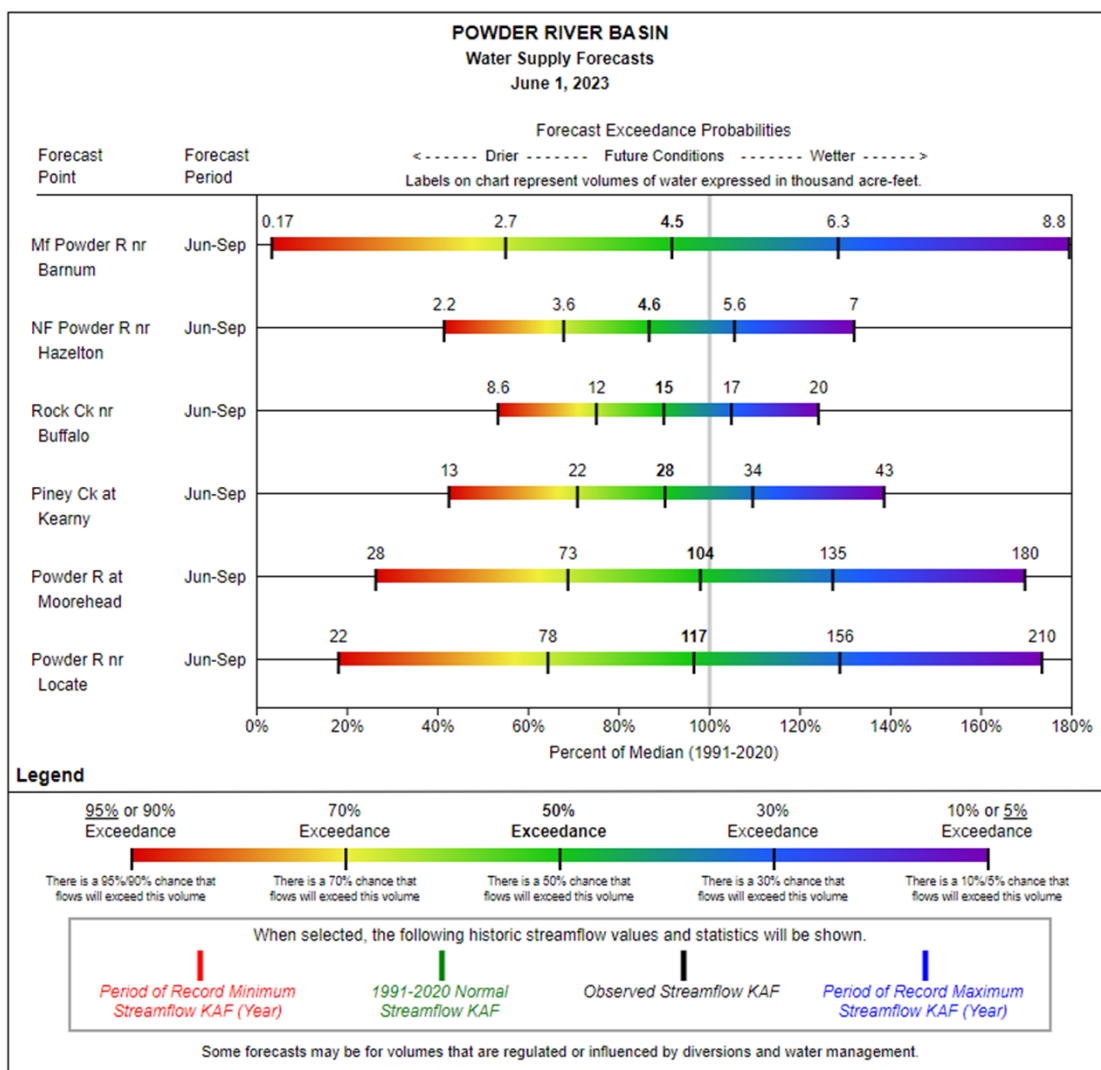
<https://www.nrcs.usda.gov/wps/portal/wcc/home/waterSupply/waterSupplyForecasts/>





# Powder Water Supply Forecast

This chart takes a while to understand but take your time to look at the axes and the legend. It holds valuable information. The exceed value is percent chance that flows exceed will exceed a given volume. For instance, 90% exceedance means there is a 90% chance it will be above and a 10% chance it will be below. It's still a 1/10 chance of being below.



**Powder River Water Supply:** : This chart was last updated in June, but includes the predicted water supply forecast for July through September. In the Powder River Watershed, streamflow is forecast to be close to the 30-year median, with a 30%-50% chance that the amount of water will be more than the median for most sites.

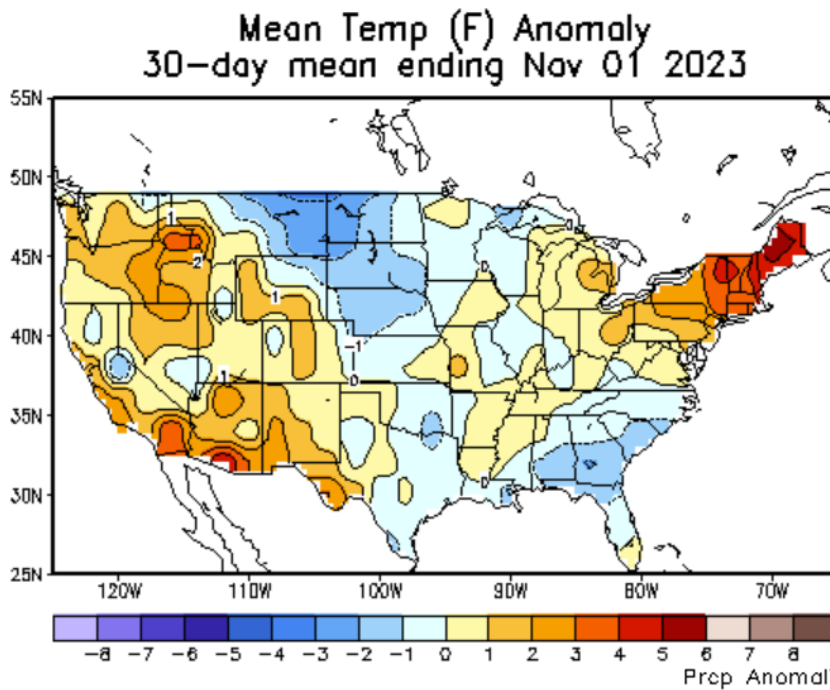
Sources:

<https://www.nrcs.usda.gov/wps/portal/wcc/home/waterSupply/waterSupplyForecasts/>



# Temperature and Precipitation

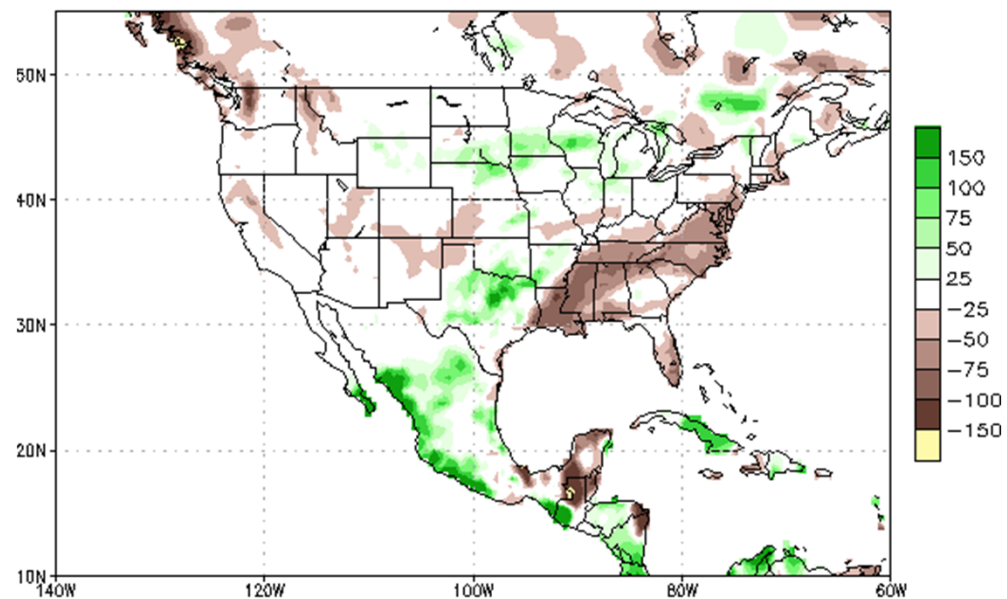
Temperature and precipitation are large drivers of changes in drought conditions. As you might expect, high temperatures and low precipitation can worsen drought conditions while low temperature and high precipitations can improve them.



## **Temperature Anomaly:**

The average temperature in October was 40 to 45 degrees, which is about 2 to 3 degrees below average for Sheridan County.

**Precipitation Anomaly:** The precipitation anomaly for most of Sheridan County was between 0-25 mm, although some areas may have experienced between 25-50 mm more precipitation than usual.



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)  
[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)

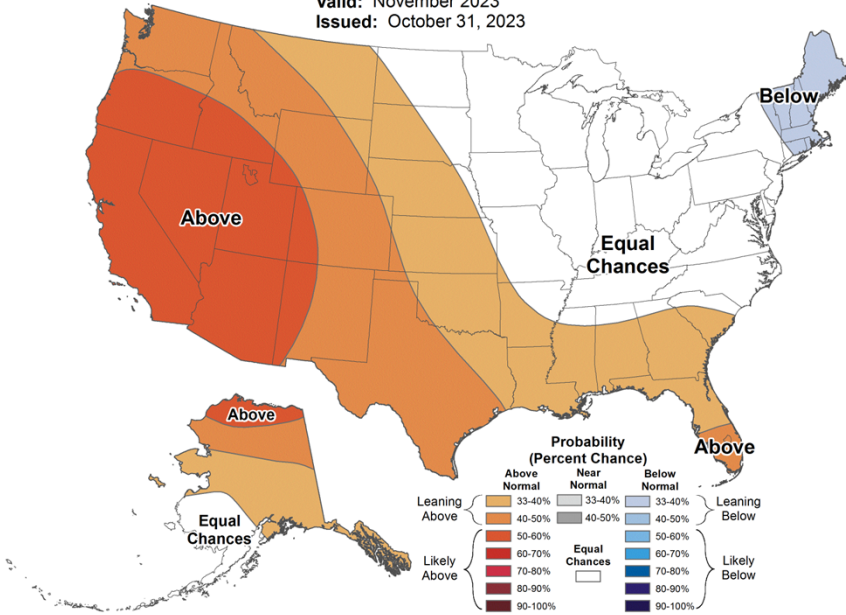
Explore link above for an Interactive map that displays percentage chance above and below normal for any point in US.



## Monthly Temperature Outlook



Valid: November 2023  
Issued: October 31, 2023



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

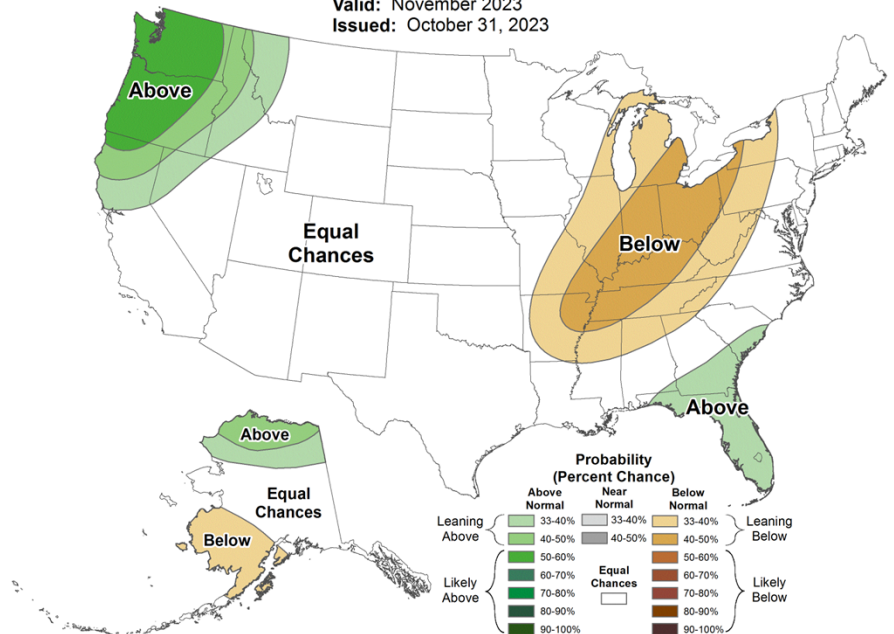
**Precipitation:** Sheridan County was expected to have higher than normal precipitation than usual last month, but this month precipitation is expected to be around average with an equal chance of it being higher or lower.



## Monthly Precipitation Outlook



Valid: November 2023  
Issued: October 31, 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.

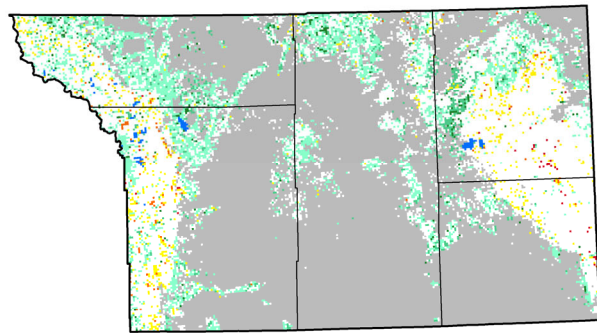
## Vegetation Drought Response Index

Complete: Wyoming, Region 2

October 29, 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: As

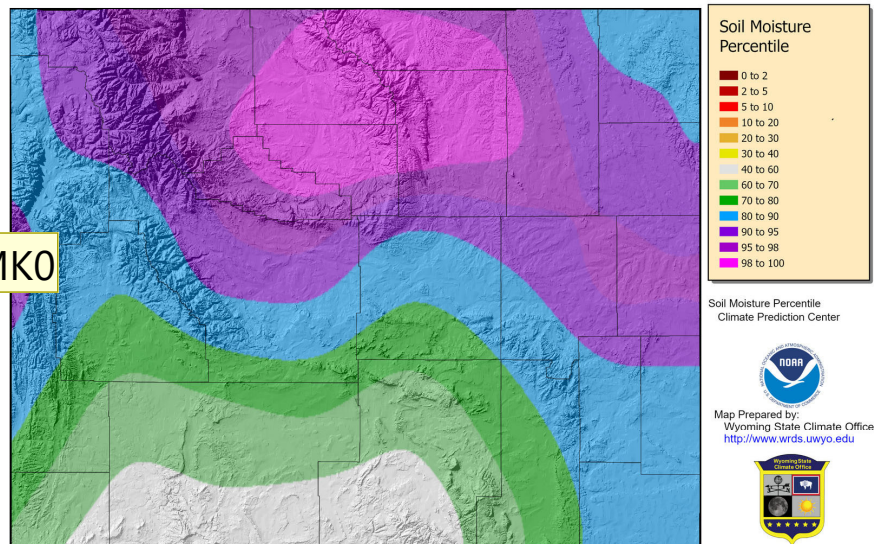
we approach the end of the growing season, most of the county continues to experience unusually moist vegetation conditions. Grey areas represent where the growing season has already ended. In the Bighorn mountains and foothills, some pre-drought vegetation stress is observed.

## Soil Moisture:

Soil moisture is high in Sheridan County, falling above the 98 to 100<sup>th</sup> percentile for most of the county. Ranking percentiles are based on soil moisture average from 1932-2000.

Soil Moisture Percentile for 02 Nov 2023

MKO



Soil Moisture Percentile  
Climate Prediction Center



Map Prepared by:  
Wyoming State Climate Office  
<http://www.wrds.uwyo.edu>



Provisional data, subject to revision

Modeled Soil Moisture Percentile [https://www.cpc.ncep.noaa.gov/products/GIS/GIS\\_DATA/USDM\\_Products/soil/soil\\_percentile.php](https://www.cpc.ncep.noaa.gov/products/GIS/GIS_DATA/USDM_Products/soil/soil_percentile.php)  
Map Created 03 Nov 2023 <http://www.wrds.uwyo.edu>

Sources: [https://vegdri.unl.edu/Home/VegDRIQuad.aspx?WY\\_2](https://vegdri.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)  
<http://www.wrds.uwyo.edu/Soil/SM-Ptile-Current.html>



# 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](mailto: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://veg dri.unl.edu/Home/VegDRIQuad.aspx?WY,2>