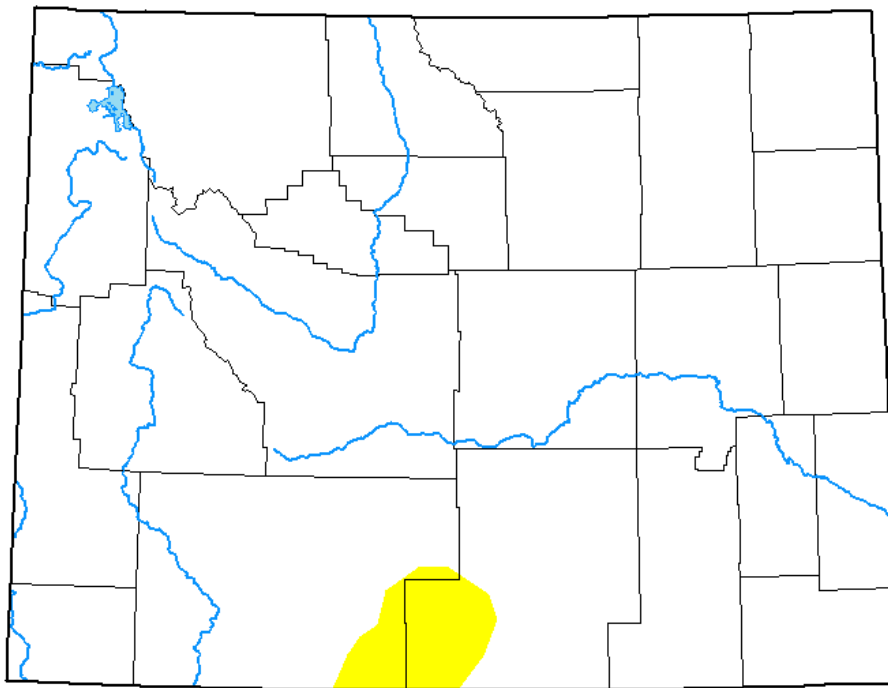


Sheridan County Water Supply Report







October - 2023

U.S. Drought Monitor
Wyoming

September 26, 2023
(Released Thursday, Sep. 28, 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 <http://droughtmonitor.unl.edu/About.aspx>

Author:

Richard Heim
NCEI/NOAA



droughtmonitor.unl.edu

Compiled for SCLT by Rebecca Ash. Contact 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
LAND TRUST
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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.



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Highlight of the Month

Happy New Water Year!

What's this? Just like a fiscal year, a water year has a start and end date different than a calendar year. Every September 30th marks the end of a water year and the start of a new one begins every October 1st.

Why such odd dates? The water year begins in October because that is usually the time when the water flow in a river is at its lowest point. This is known as the baseline. As the water cycle continues, snow melt and percolation in the warmer months will increase the water levels and then it drops off again in the fall. [Click here to download the 2022-23 Water Supply Wrap Up.](#) The yearly water supply sums up the water year compared to the previous water year.

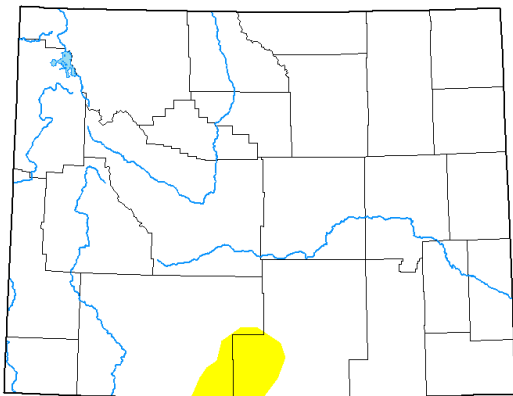


Drought Index and Change

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
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Author:
Richard Heim
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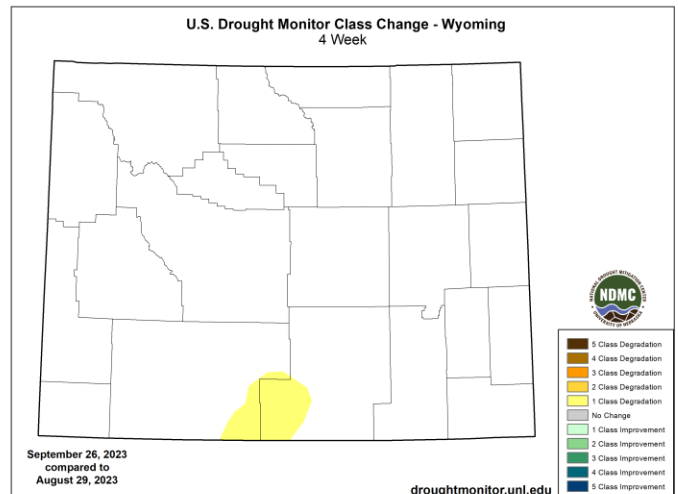


Current Drought Monitor:

No portion of Sheridan County is experiencing drought conditions. This is a constant from last month, as well as an improvement from last year's conditions which was classified as abnormally dry at this time of the year. Elevated precipitation over the past water year continues to alleviate drought in the county.

Change in Drought Monitor:

Fall is here to stay! There has been no change in the county's drought status throughout the month of September. The entire county has been free of drought conditions for the past five months due to the amount of precipitation that has been received. There has been no change of drought throughout the entire state during the month of September.



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	2023-09-26	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week to Current	2023-09-19	100.00	0.00	0.00	0.00	0.00	0.00	0
3 Months Ago to Current	2023-06-27	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	2022-09-27	49.02	50.98	0.00	0.00	0.00	0.00	51
One Year Ago to Current	2022-09-27	49.02	50.98	0.00	0.00	0.00	0.00	51

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.”

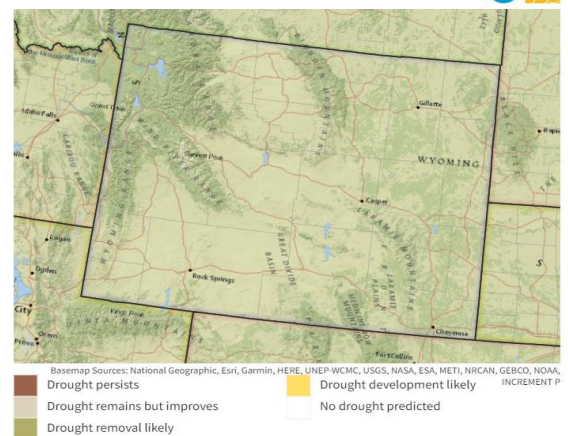
History of Drought Monitor: Last year, in September of 2022, Sheridan County was experiencing abnormally dry to moderate Drought conditions (D0-D4). Conditions improved steadily through 2022, especially with the start of the new water year in September and have remained constant with 100% of the county being free of drought conditions.

Forecast for Drought Monitor:

“ Autumn is a time of transition in the West Region, and there are a variety of climatological changes that occur in the period. Currently, the main drought areas are located in northwestern and southeastern parts of the region. The remainder of the region is almost drought free...”¹

Forecast confidence is moderate for the West Regions.

U.S. Monthly Drought Outlook



[Drought.gov](#)

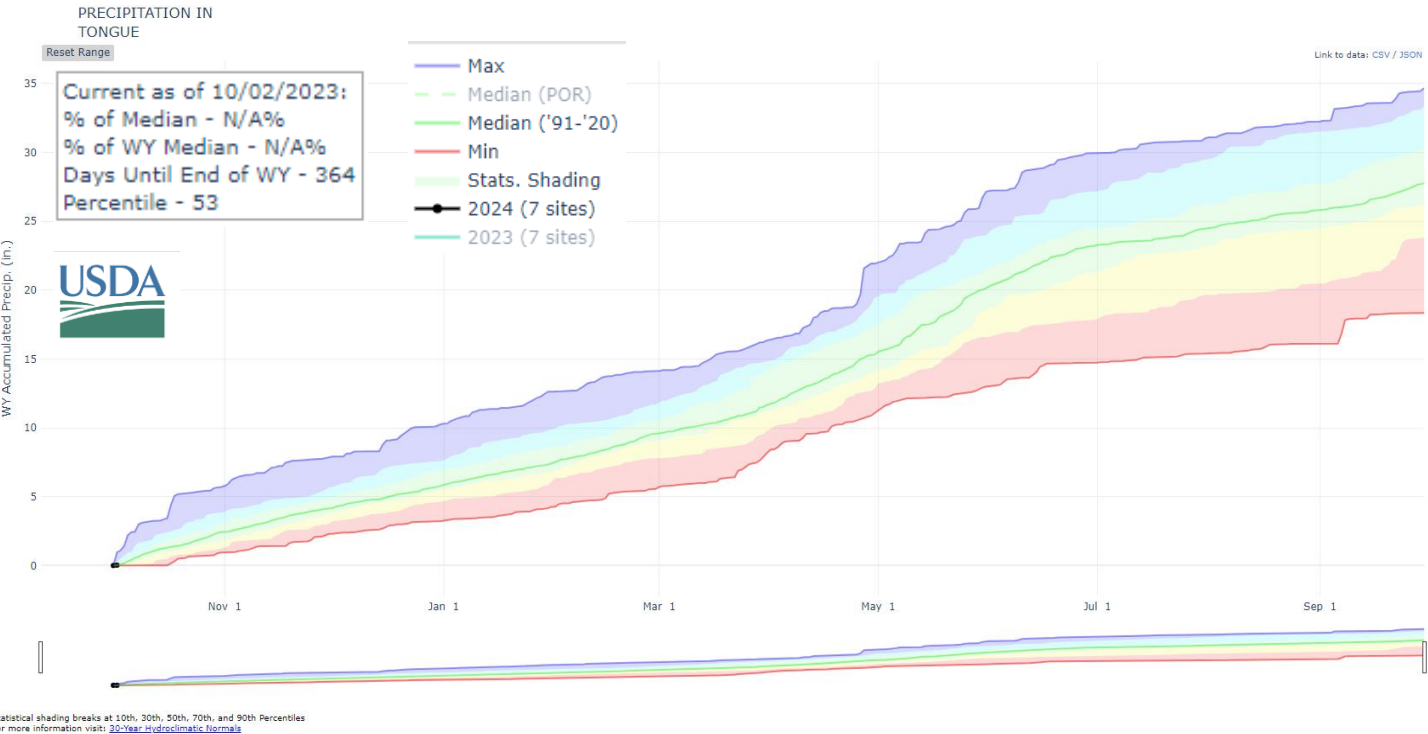
Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
<https://www.drought.gov/forecasts>

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 in Tongue River Watershed: Precipitation in the Tongue River Water Shed starts off the new water year in the 53rd percentile. Due to the start of the new water year the accumulated perception was reset to zero as of October 1st.

Sources:

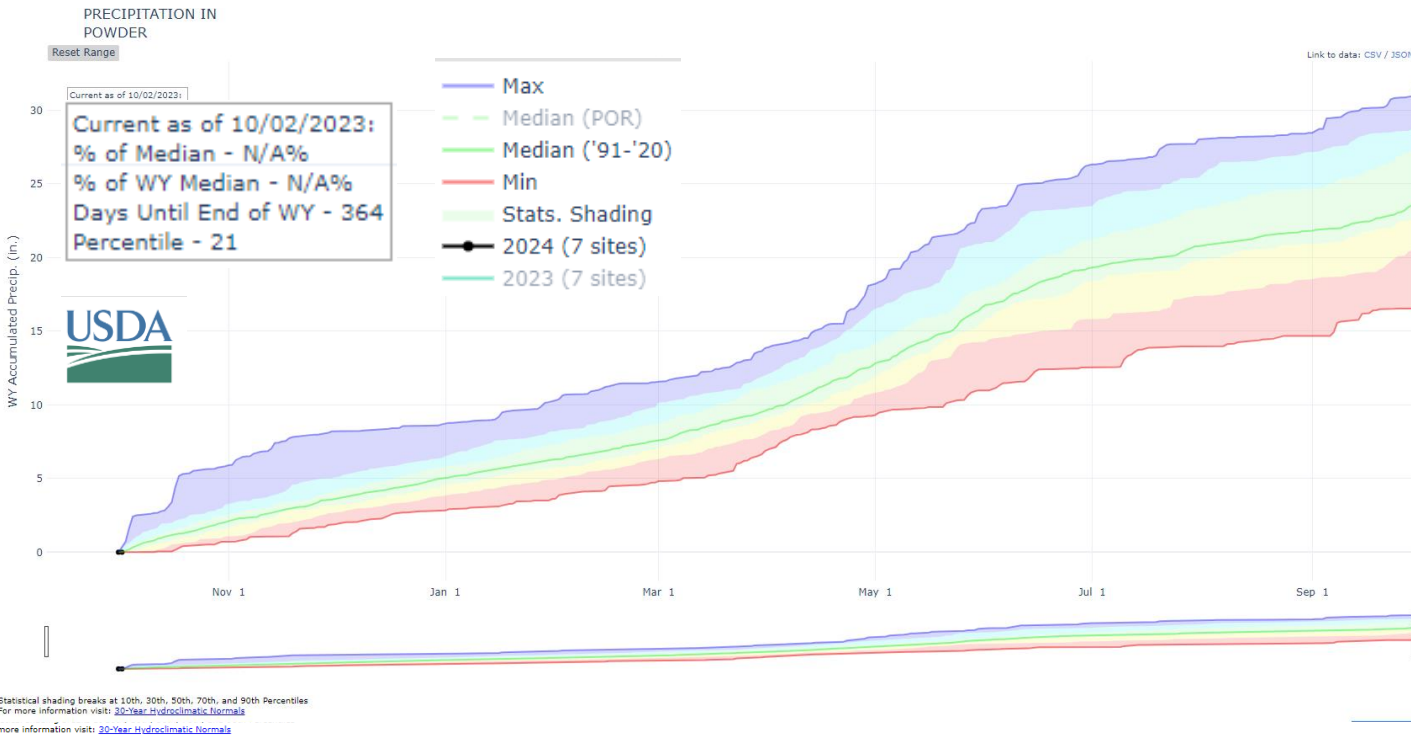
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100901_Tongue.html

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: Precipitation in the Big Horn Mountains for the Powder River watershed starts the new water year off in the 21st percentile. Due to the start of the new water year the accumulated perception was reset to zero as of October 1st.

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

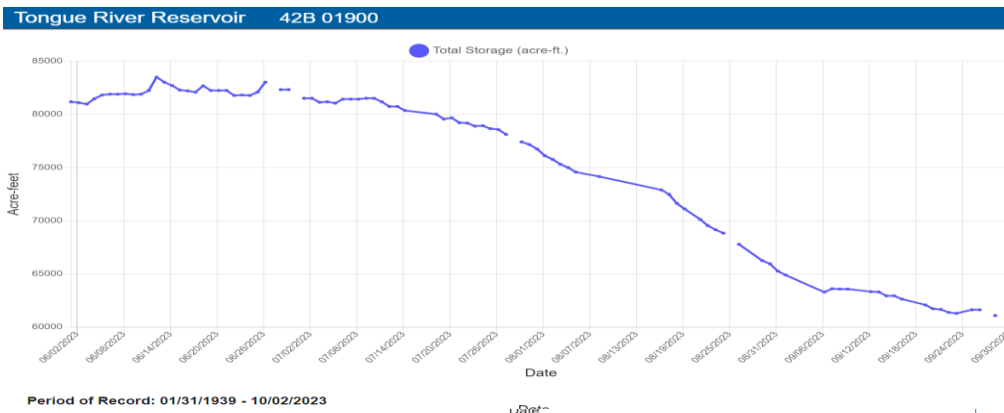
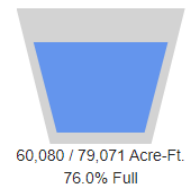
As of October 1, 2023 lake DeSmet has continued to decrease to a total of 204,598 acer-feet in storage, which is 87% of its total capacity.

Reservoir	Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	1,680	5,756	4,624	29.2
Cross Creek	387	798	798	48.5
Dome Lake No.1	1,062	1,506	1,506	70.5
Kearney Lake	1,376	7,500	6,324	18.3
Park	5,028	12,500	10,362	40.2
Sawmill	796	1,831	1,275	43.5

Tongue River Reservoir

The Tongue River Reservoir declined in the month of September to being 76.0% full. This is a 6.1% decrease. It currently is at 60,080 acre feet of water storage as of October 2, 2023.

Reservoir Level



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

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

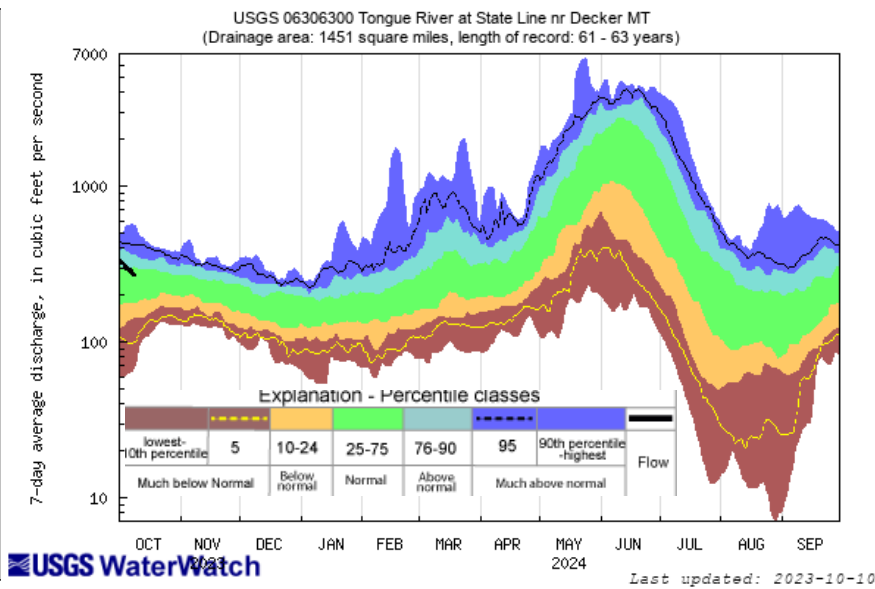
[https://gis.dnrc.mt.gov/apps/stage/gage-](https://gis.dnrc.mt.gov/apps/stage/gage-report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/)

[report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/](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

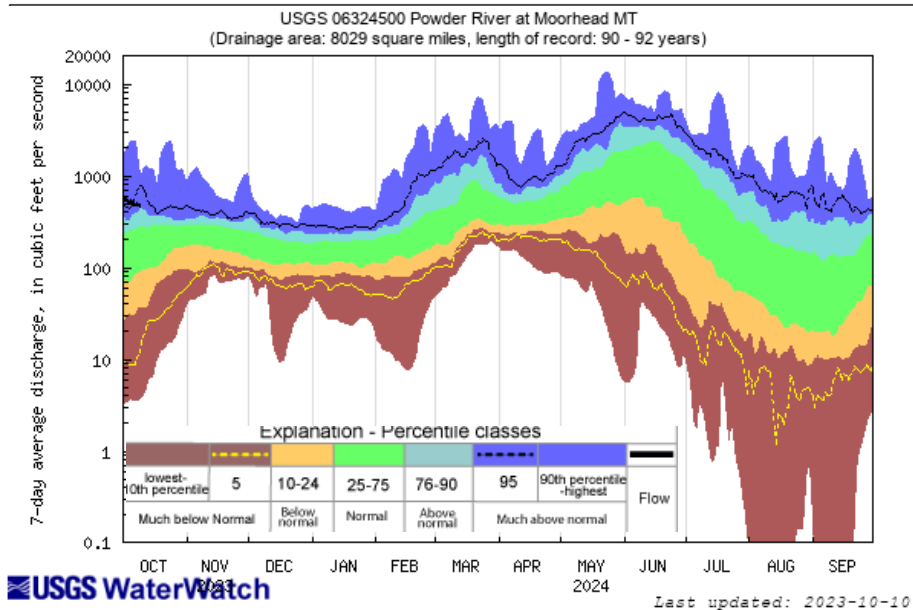


Tongue River Border Station

Stream Flow: Throughout the month of September, the average discharge was approximately 240 cfs. This amount of discharge is considered normal for this time of year. This information is current as of October 1st.

Powder River Border Station

Stream Flow: Through out September, the average discharge was approximately 470 cfs . Even though the rate has decreased since the beginning of the previous month, streamflow for the Powder River is above normal for this time of year. This information is current as of October 1st.



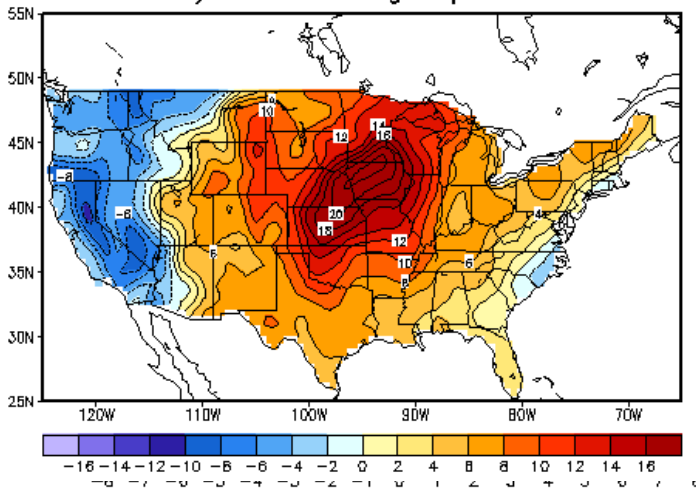
Sources: <https://waterwatch.usgs.gov/index.php?id=mv01d>
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06324500



Temperature and Precipitation

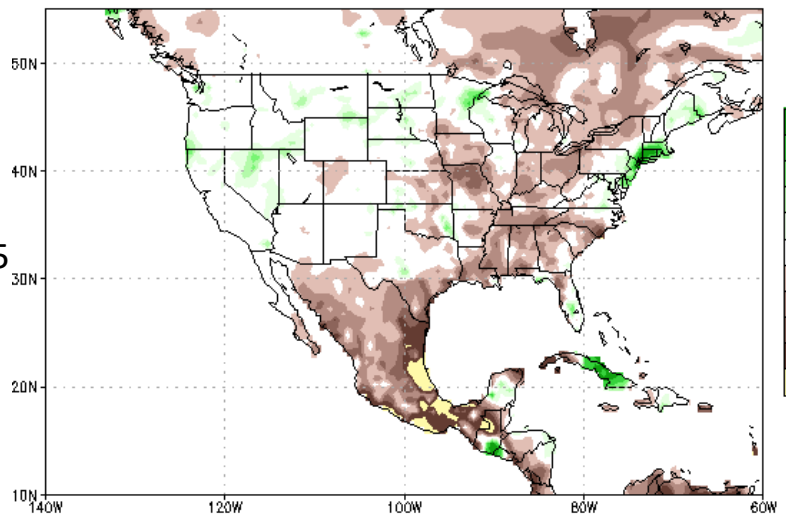
Temperature and precipitation are large drivers of changes in drought conditions. As you might expect, high temperatures and low precipitation can worsen drought conditions while low temperature and high precipitations can improve them.

Mean Temp (F) Anomaly
1-day mean ending Sep 30 2023



Temperature Anomaly: Throughout September, the temperature in Sheridan County was no more than 4-6 degrees more than expected. The average temperature for Sheridan in the past 14 days is between 55 and 60 degrees Fahrenheit.

Prpc Anomalies (mm) 02SEP2023-01OCT2023



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

Precipitation Anomaly: The precipitation anomaly for September in Sheridan County was between 0-25 mm. There has been no change in precipitation compared to the previous month.

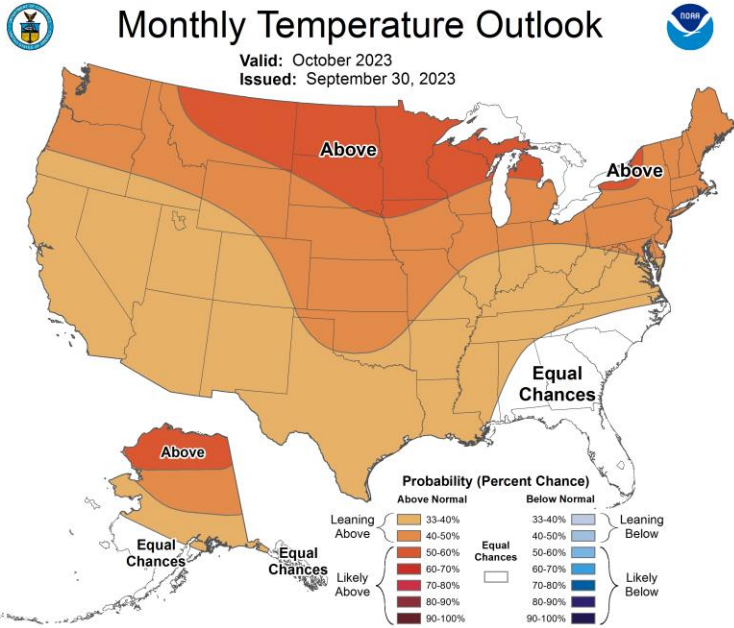
Sources: https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php
https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php



Temperature Forecast and Precipitation Forecast

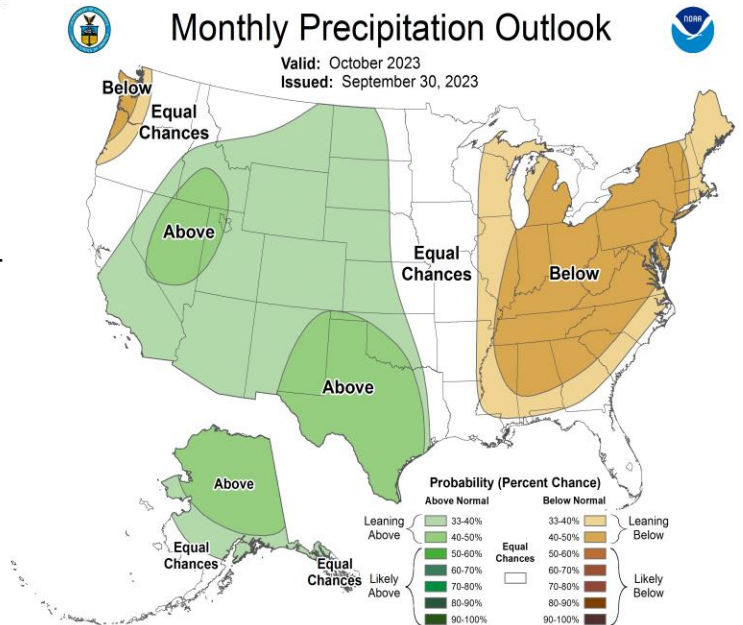
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php

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 40-50% chance of having Temperatures above average for the month of October.

Precipitation: Sheridan County has a 33-40% percent chance of receiving precipitation above the normal amount for the month of October.



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

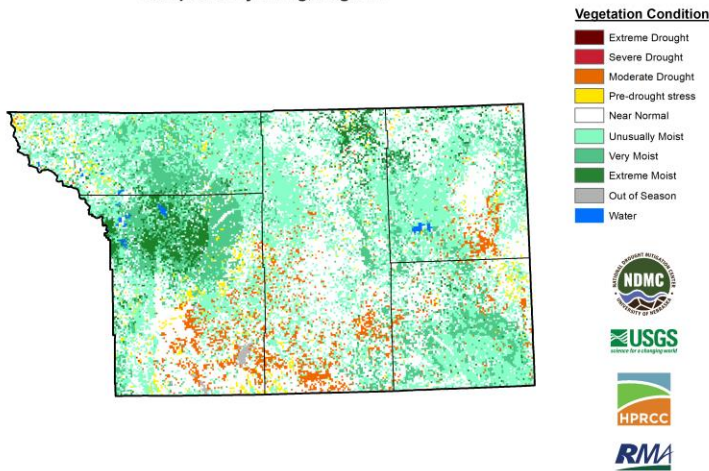


Vegetation Drought Response and Soil Moisture

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

September 24, 2023



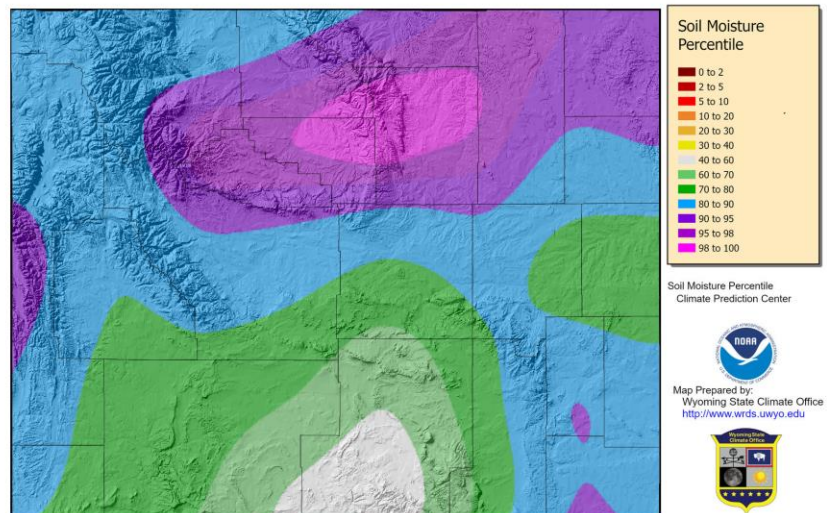
Vegetation Drought Response:

The Vegetation Drought Response Index shows that Sheridan County will be entering October with unusually moist conditions.

Soil Moisture:

As of October 1, the soil moisture in Sheridan County falls almost completely above the 90th percentile except for the North West corner of the county which falls into the 80-90 percentile. Ranking percentiles are based on soil moisture average from 1932-2000.

Soil Moisture Percentile for 01 Oct 2023



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
Map Created 02 Oct 2023 <http://www.wrds.uwyo.edu>

Sources: <https://vegdril.unl.edu/Home/VegDRIQuad.aspx?WY,2>
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
<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>