Sheridan County Water Supply Report

September - 2023

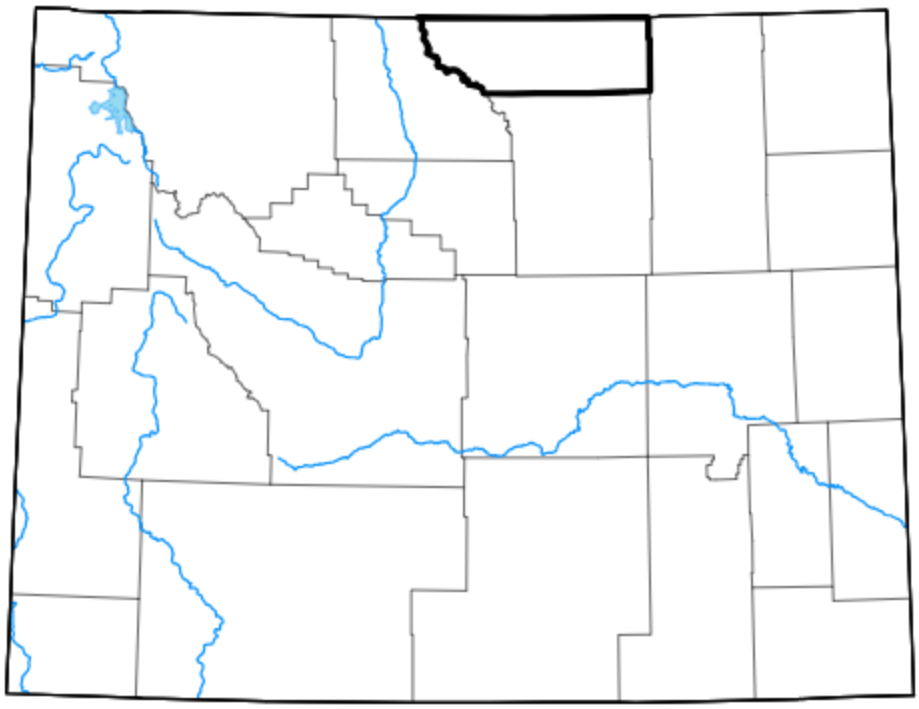
U.S. Drought Monitor

Wyoming

August 29, 2023

(Released Thursday, Aug. 31, 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

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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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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

Highlight of the Month

Are you Busy as a Beaver?

Fall is in the air and the pumpkin spice season is just getting started. As the days begin to become noticeably shorter, there still is a lot of work to be done. This month's highlight is about our busy beavers! Like us, fall is one of the busier times of the year for beavers. For a beaver family to survive another winter, it is important for them to collect and stock up their food cache. Their food cache consists of younger branches from trees and willows, which they store underwater.

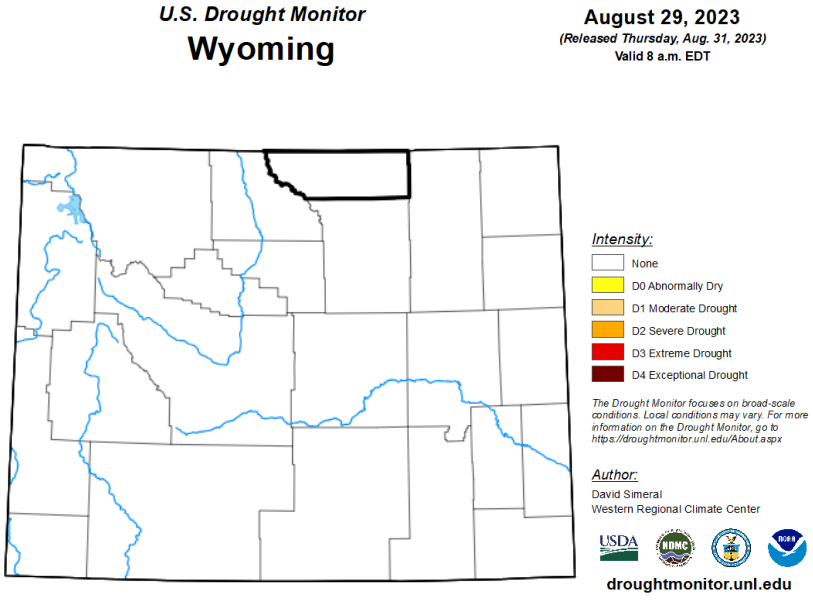
In the right place, the beavers' role in an ecosystem is very important. Beaver dams increase riparian area, increase biodiversity, improve fish habitat, and reconnect steams to flood plains. Today, we can mimic these benefits by building structures called Beaver Dam Analogs (BDA'S), which simulate the dam's effect of reconnecting the stream to the flood plain. Multiple organizations are working on these structures in the Sheridan area including Wyoming Game and Fish, Back Country Hunters and Anglers (BHA), and the University of Wyoming.

Sources: https://www.dcnr.pa.gov/GoodNatured/pages/Article.aspx?post=203

https://shorturl.at/pxzQU

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.

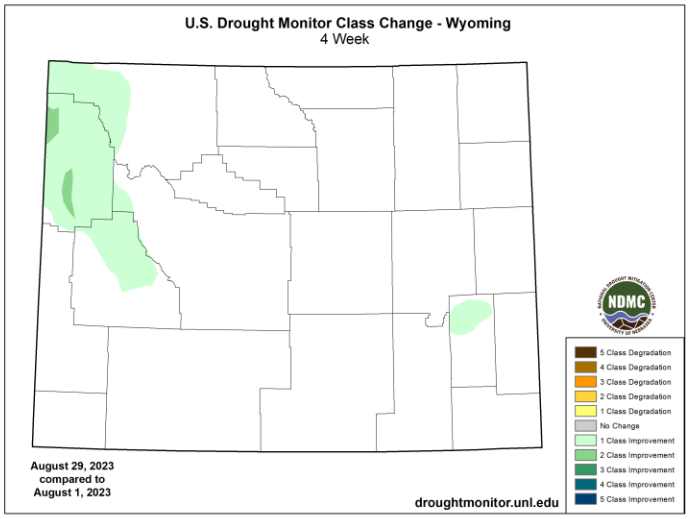


Current Drought Monitor:

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 alleviated drought in the county.

Change in Drought Monitor:

We enter the fall months drought free! There has been no change in the county's drought status throughout the month of August. The entire county has been free of drought conditions for the past four months due to the amount of precipitation that has been received. Counties to the West continue to show class one improvement of drought.



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	2023-08-29	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week to Current	2023-08-22	100.00	0.00	0.00	0.00	0.00	0.00	0
3 Months Ago to Current	2023-05-30	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	2022-08-30	6.09	64.21	29.70	0.00	0.00	0.00	124

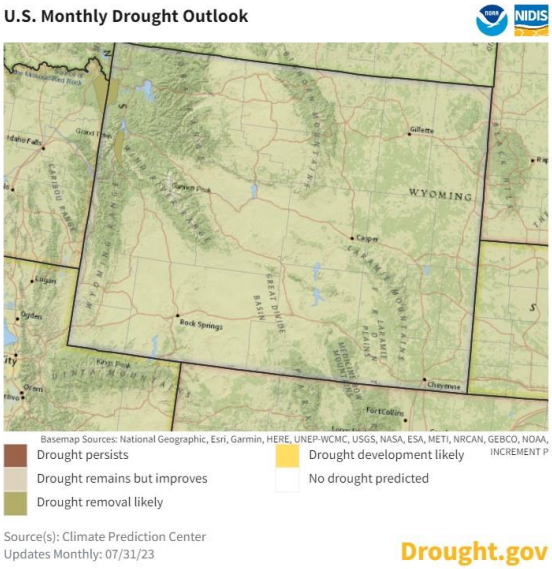
DSCI stands for Drought Severity and Coverage Index. It is "an experimental method for converting drought levels from the U.S. Drought Monitor map to a single value for an area."

History of Drought Monitor: Last year, in Aug of 2022, Sheridan County was experiencing abnormally dry to moderate Drought conditions (D0-D1). 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:

"On this week's map, no changes were made across the Plains states while some minor improvements were made in northwestern Wyoming and some degradations in south-central Colorado. Across the Plains, hot and dry conditions prevailed across much of the region this week with well-above normal temperatures (2 to 8 degrees F) observed,."[1]

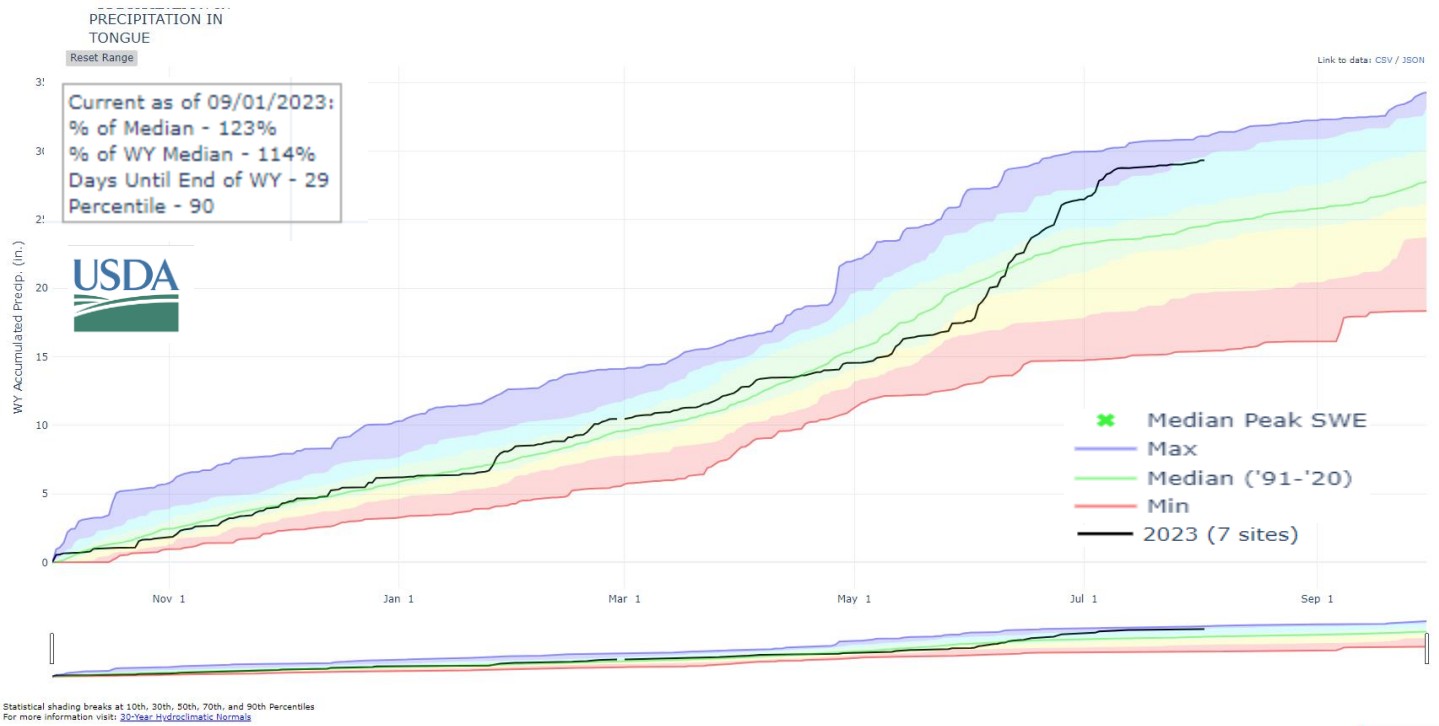
Forecast confidence is moderate for the High Plains Regions.



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.

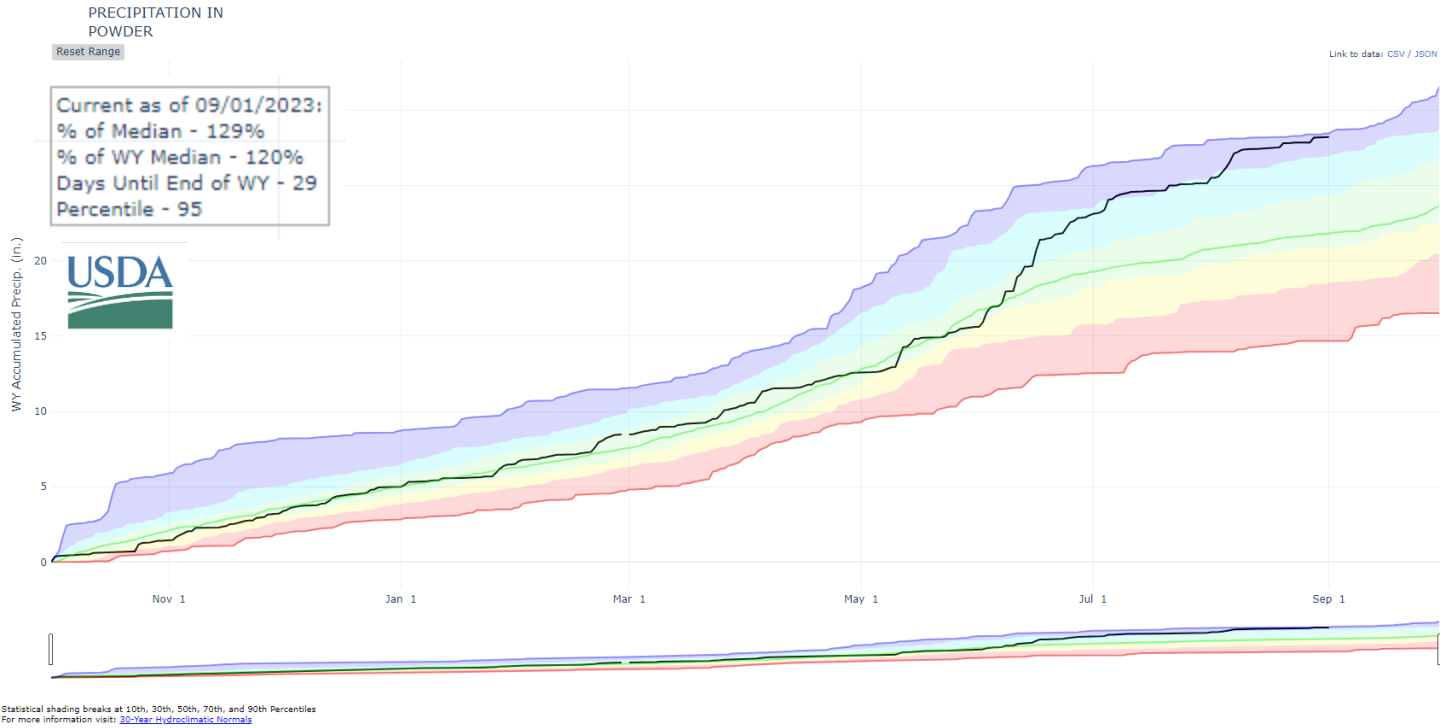


Precipitation in Tongue River Watershed: : Precipitation in the Tongue River Water shed is currently is at 123% of median which is in the 90th percentile. As of September 1st, the stations have recorded approximately 31.0 inches of precipitation. This is a 1.0-inch increase since Aug 1, 2023.

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 Bighorn Mountains for the Powder River watershed has continued to increase since the beginning of July. It is currently 129% of median which is in the 95th percentile. As of September 1st, the stations have recorded approximately 33.0 inches of precipitation. This is a 3-inch increase from Aug 1, 2023.

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 & Stream Flow

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

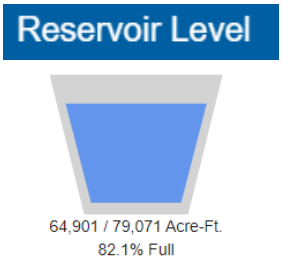
Lake DeSmet

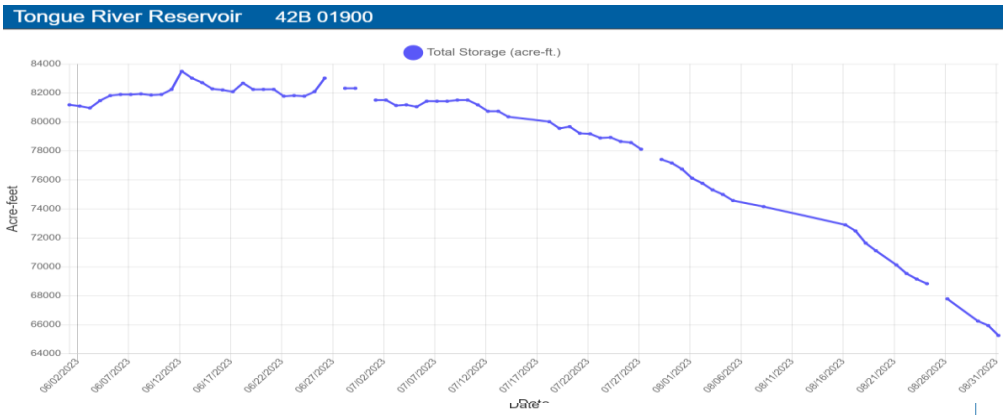
As of Sept. 1, 2023, Lake DeSmet has decreased to a total of 210,155 A.F. in storage, which is 89% of its total capacity.

Reservoir	Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	3,399	5,756	4,624	59.0
Cross Creek	519	798	798	65.1
Dome Lake No.1	1,150	1,506	1,506	76.3
Kearney Lake	2,609	7,500	6,324	34.8
Park	7,364	12,500	10,362	58.9
Sawmill	930	1,831	1,275	50.8

Tongue River Reservoir

The Tongue River Reservoir declined in the month of August to being 82.1% full. This is a 13.2% decrease. It currently is at 64,901.36 acre feet of water storage as of September 1, 2023.



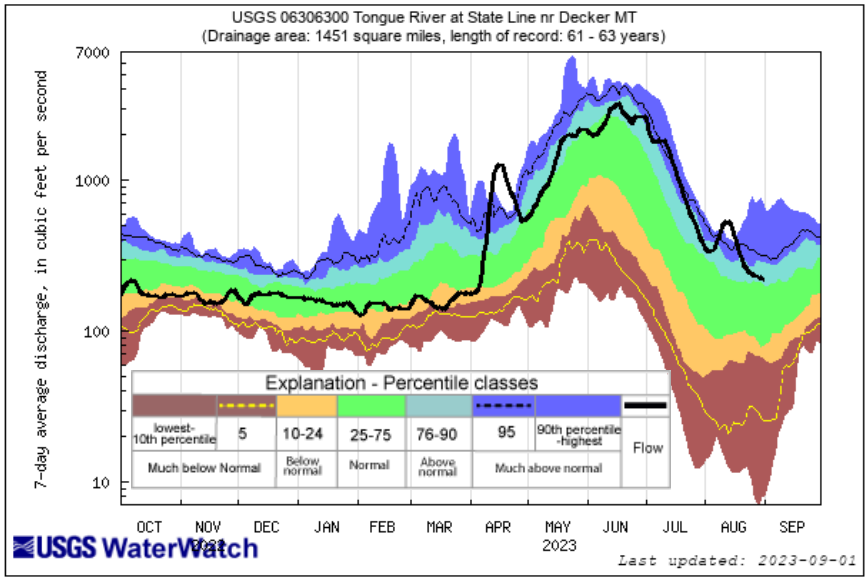


This graph displays the real time data of the Togue River Reservoir. This data remains provisional until it is officially re viewed due to variables that can affect the gages. Things that can effect that data includes but not limited to algal and aquatic growth, sediment movement, malfunction of recording 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/

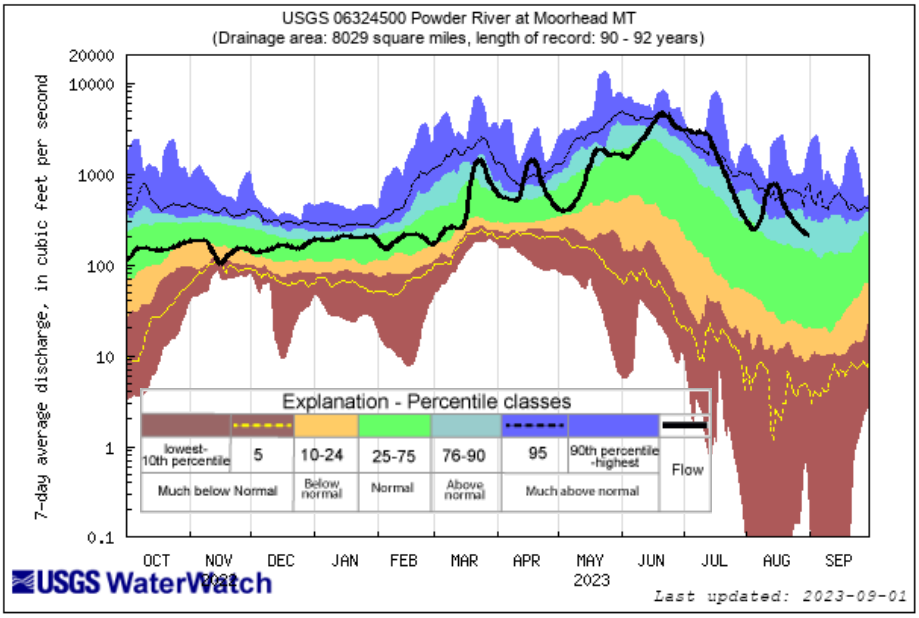
Select Stream Flow Stations

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: Throughout August, the average discharge was approximately 338.50 cfs. Even though the rate has decreased since the beginning of the previous month, streamflow for the Tongue River is above normal for this time of the year.

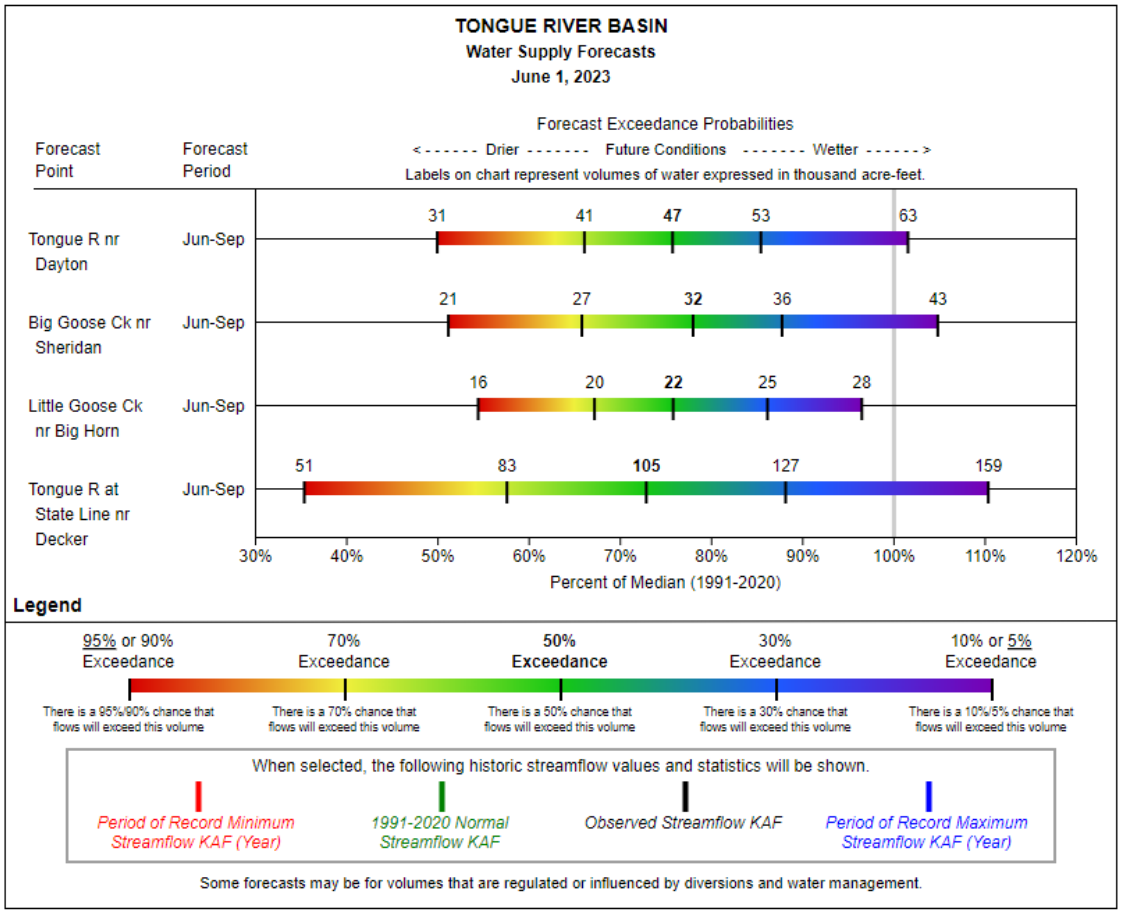
Powder River Border Station Stream Flow: Through out August, the average discharge was approximately 419.46 cfs . Even though the rate has decreased since the beginning of the previous month, streamflow for the Powder River is above normal for this time of year.



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

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.

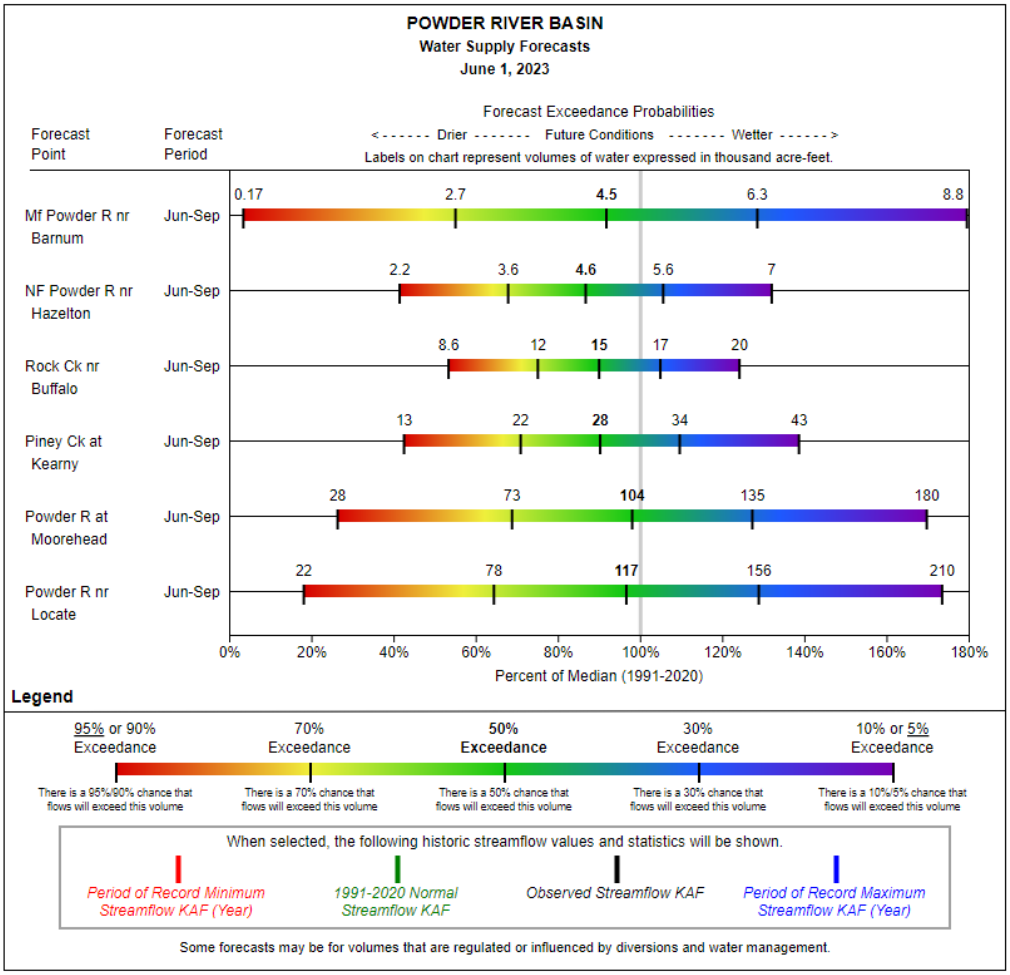


Tongue River Water Supply: This chart was last updated in June, but includes the predicted water supply forecast for July through September. In the Tongue River watershed, based on the Jun-Sept forecast, we are likely to see at least 75% of median. Based on this forecast, there is only a 5-10% chance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

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.

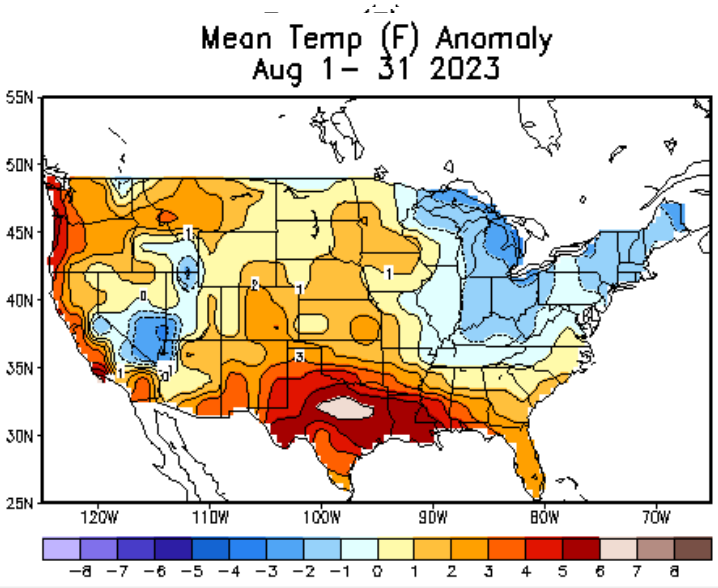


Powder River Water Supply: : This chart was last updated in June, but includes the predicted water supply forecast for July through September. In the Powder River Watershed, streamflow is forecast to be close to the 30-year median, with a 30%-50% chance that the amount of water will be more than the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

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

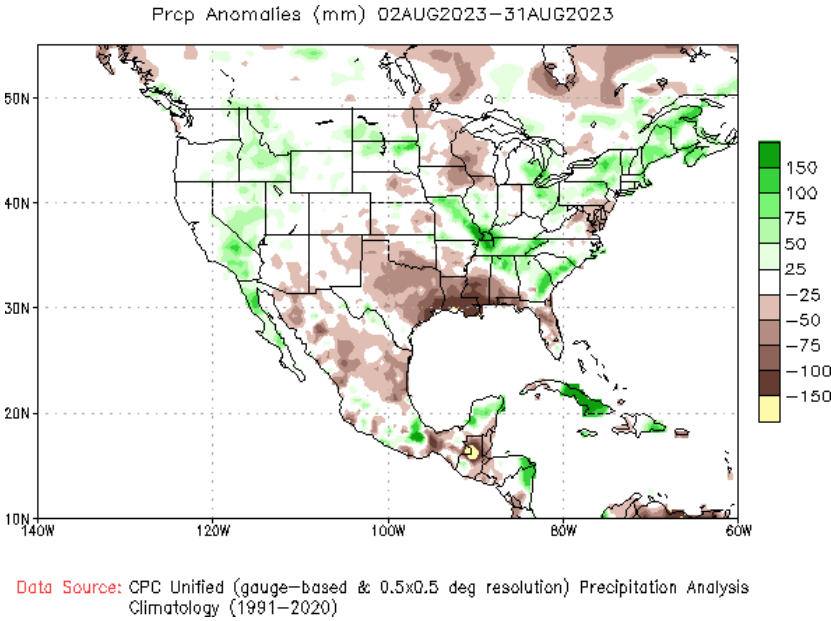
Temperature and Precipitation

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: Throughout August, the temperature in Sheridan County was no more that 1 degree more than expected. The average temperature for Sheridan in the past 14 days is between 70 and 75 degrees Fahrenheit.

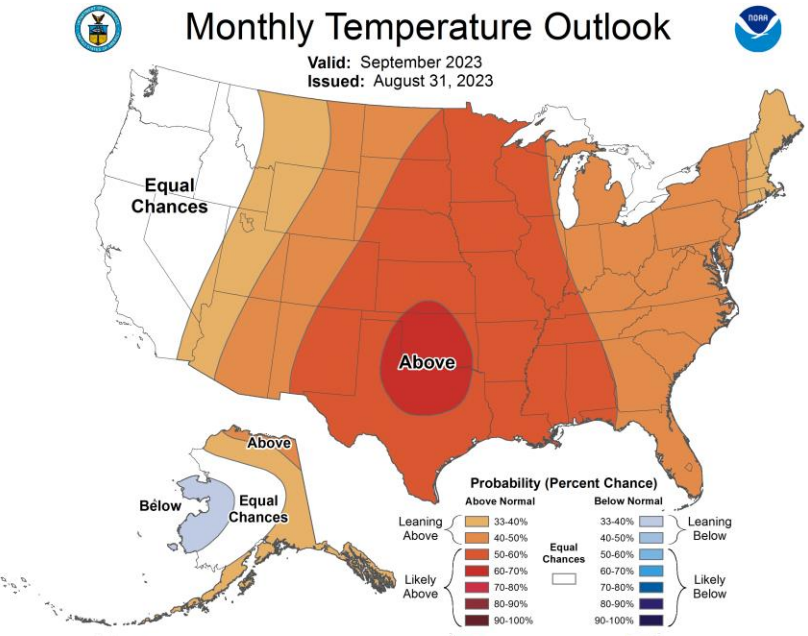
Precipitation Anomaly: The precipitation anomaly for August in Sheridan County was between 0-25 mm. There has been no change in precipitation compared to the previous month.



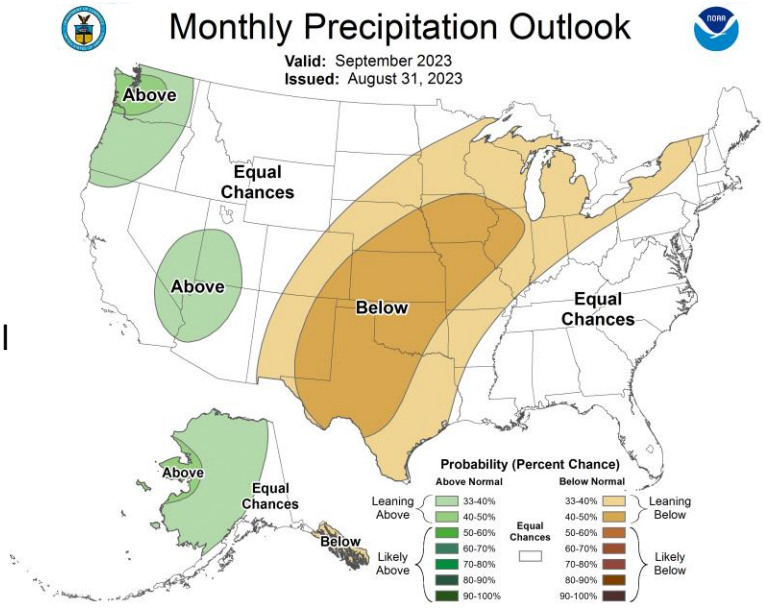
Sources: https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php
https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

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 September.

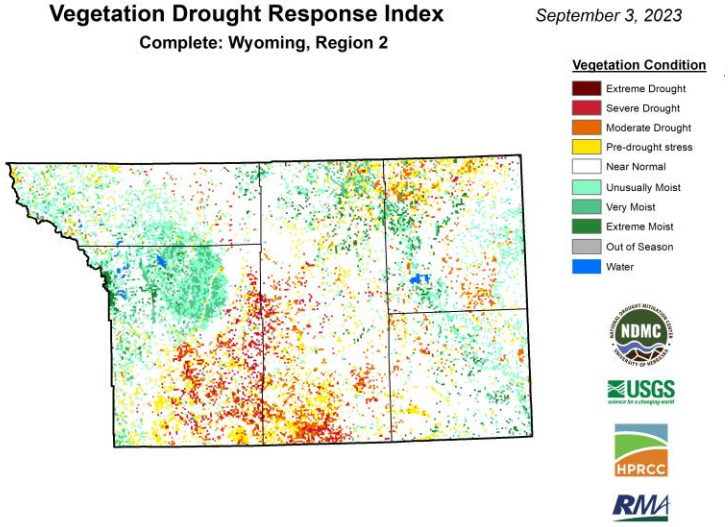


Precipitation: Sheridan County has an equal percent chance of receiving precipitation above or below the normal amount for the month of September.

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

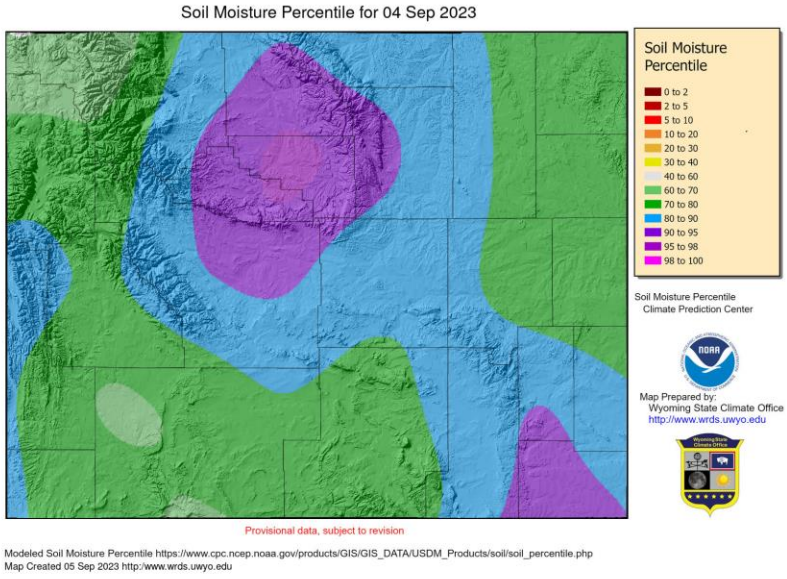
The graphs below are two ways of visualizing on-ground conditions. The vegetation Drought Response Index (Vegdri) uses a satellite to estimate vegetative stress. Soil moisture is helpful when looking at many things. Soil acts as a bank for moisture and can buffer drought degradation or improvement. It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



Vegetation Drought Response:. The Vegetation Drought Response Index shows that Sheridan County will be entering September with near normal to unusually moist conditions.

Soil Moisture:

As of September 4, the soil moisture in Sheridan County falls almost completely in the 80-90 percentile with the very South-West corner of the county falling into the 90-95 percentile. Ranking percentiles are based on soil moisture average from 1932-2000.



Sources: https://vegdri.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

SCLT