Sheridan County Water Supply Report

June - 2023

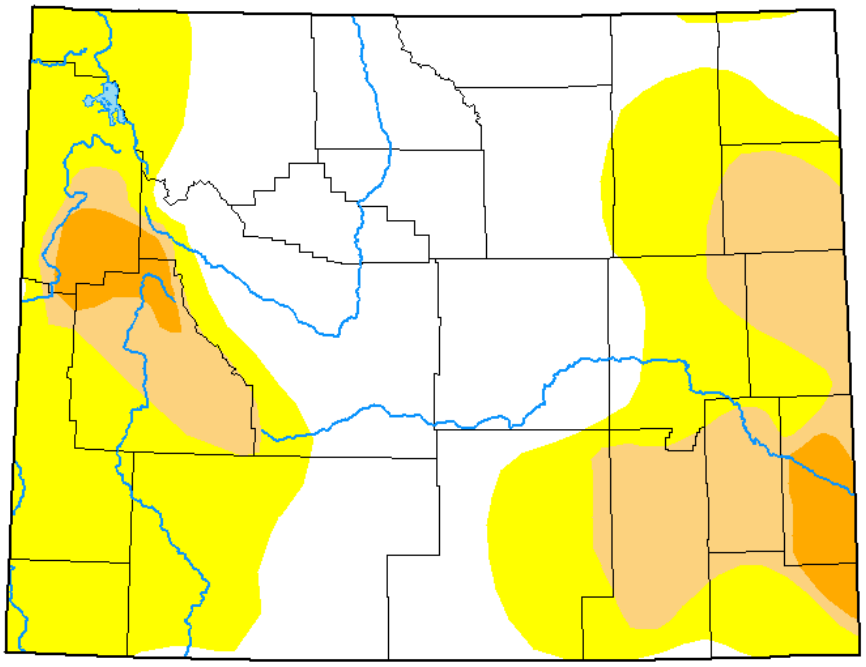
U.S. Drought Monitor

Wyoming

May 23, 2023

(Released Thursday, May. 25, 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:

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U.S. Department of Agriculture

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

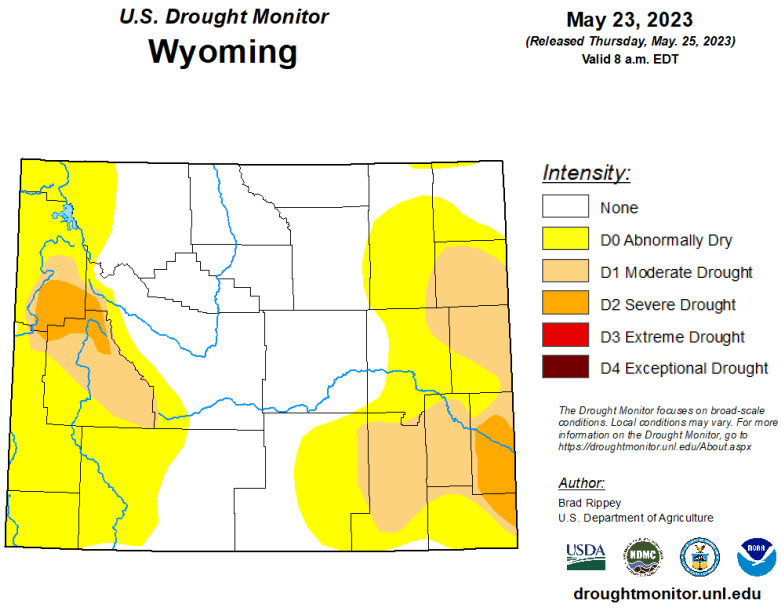
Highlight of the Month

Picture taken by Rebecca Ash

Where did Noah keep the bees during the flood? In the Ark-hives! This month's highlight is about spring runoff and flooding. The picture above is of the Tongue River at the Welch Ranch Recreation Area. As you examine the picture you can see that some of the typical upland (non-riparian) grass is surrounded by water. Don't worry, though- this is a good thing. The riparian plants that grow at the bank's edge help hold the bank together, catch sediment, and slow down the flow of water. This gives the water more time to hydrate the soil for the upland plants as well as the riparian plants. As water levels begin to decrease the water held in the soil will slowly be released back into the river and keep the upland and riparian vegetation greener longer.

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.

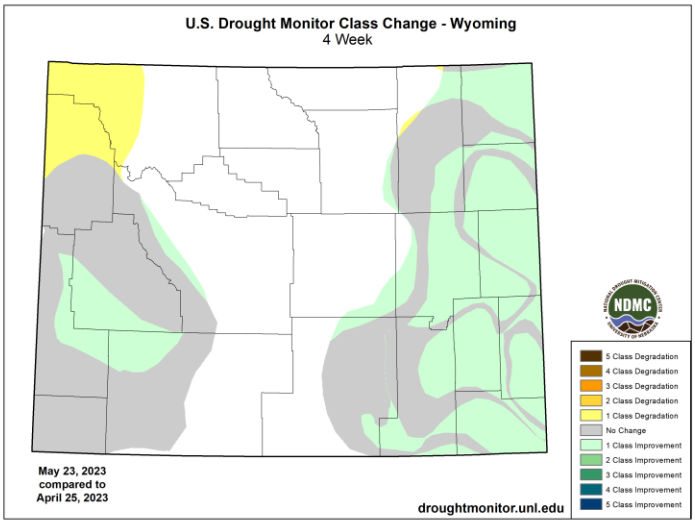


Current Drought Monitor:

No portion of Sheridan County is experiencing drought conditions. This is a constant from last month, as well as a complete change from last year's conditions which was classified as a severe drought at this time of the year. Elevated precipitation over the past water year has alleviated drought in the county.

Change in Drought Monitor:

Comparing the beginning and end of May, drought in the county has remained alleviated. The entire county is free of drought conditions. Counties to the east and west show signs of drought 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-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2023-05-23	100.00	0.00	0.00	0.00	0.00	0.00	0
Last Week to Current	2023-05-16	100.00	0.00	0.00	0.00	0.00	0.00	0
3 Months Ago to Current	2023-02-21	91.56	8.44	0.00	0.00	0.00	0.00	8
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	2022-05-24	0.00	100.00	100.00	93.56	0.00	0.00	294

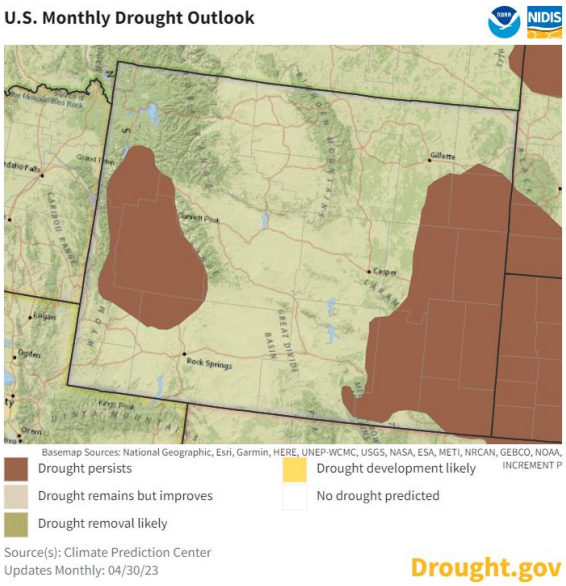
DSCI stands for Drought Severity and Coverage Index. It is "an experimental method for converting drought levels from the U.S. Drought Monitor map to a single value for an area."

History of Drought Monitor: Last year, in May 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:

"Some further improvements were introduced across roughly the southern two-thirds of the West, a combination of precipitation—especially in the central and southern Rockies—and further analysis and assessment of snow that fell during the impressively wet winter of 2022-23. In fact, recent warmth has caused some rapid melting of high-elevation snowpack, leading to some flooding. ."[1]

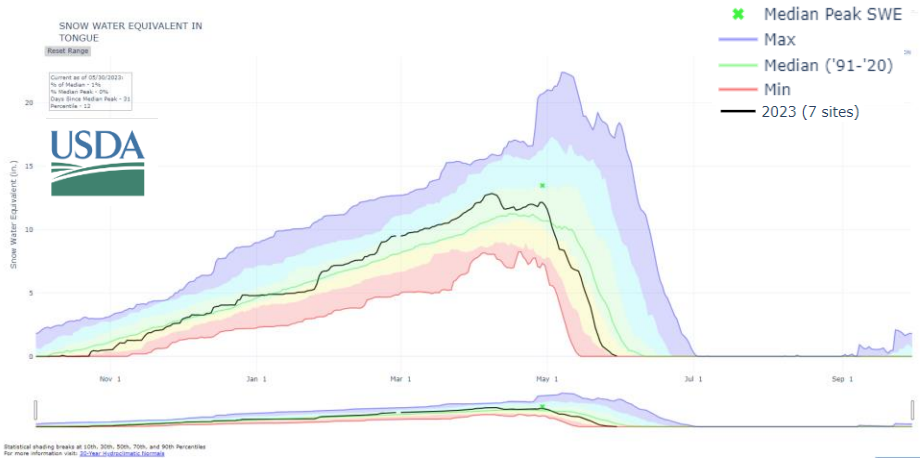
Forecast confidence is moderate for the Western and High Plains Regions.



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.

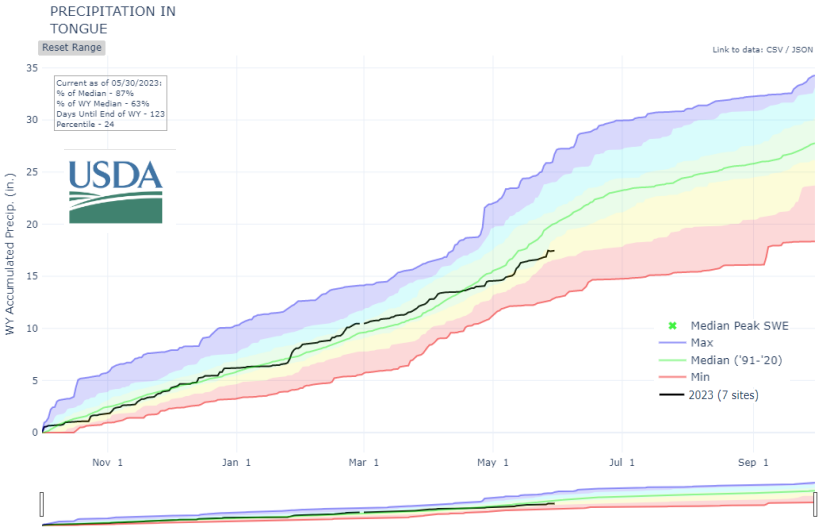


Snowpack in Tongue River Watershed:

Comparing the beginning of May to the end of May, we can see the effects of the warm sunny days. On of May 2nd, there was 11.0 in of SWE. As of May 30th there is currently 0.0 in. of SWE left. It is currently 1% of the median which is in the 12th percentile.

Precipitation in Tongue River Watershed:

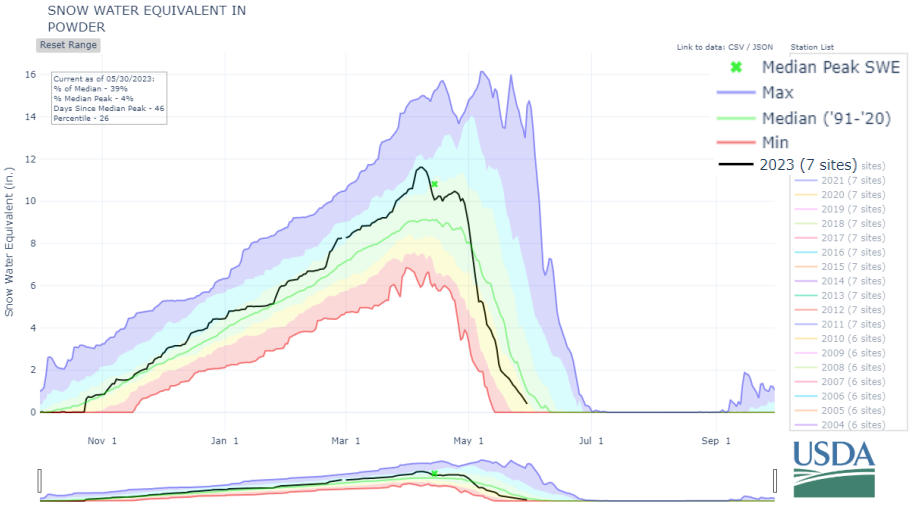
Precipitation in the Bighorn Mountains for the Tongue River watershed has begun to plateau through out the month of May. It is currently 87% of the median which is in the 24th percentile. As of May 30th, the stations have recorded approximately 17.5 inches of precipitation for the water year.



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/PREC/assocHUC6/100901_Tongue.html

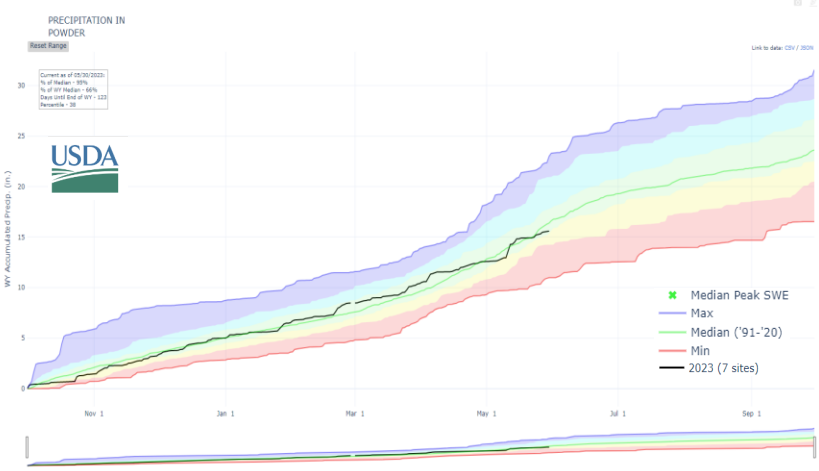
Precipitation - Powder River

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 amount of snowpack on the Powder River Range is also beginning to show the effects of the consistent warmer weather as well. As of May 30th it is reported that there is approximately 0.5 in. of SWE. This is 39% of the median which is in the 26th percentile.

Precipitation in Powder River Watershed: Precipitation in the Bighorn Mountains for the Powder River watershed has steadily increased as summer monsoons continue to occur throughout the month. It is currently 95% of median which is in the 38th percentile. As of May 30, the stations have recorded 15.6 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/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

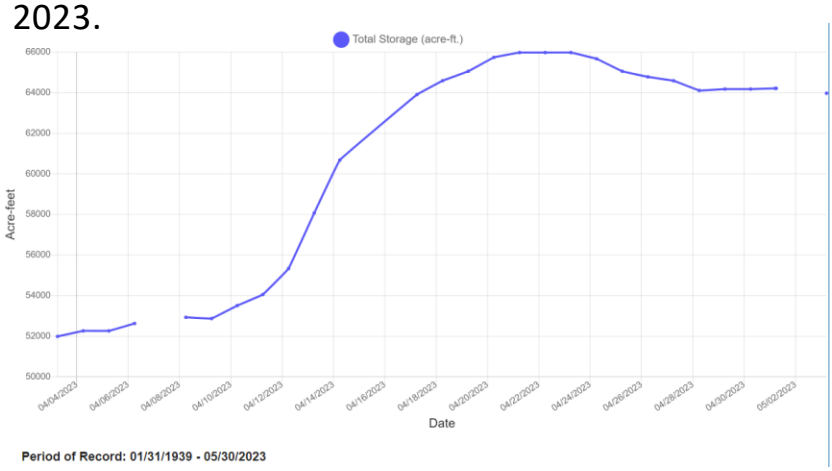
As of June 1, 2023, Lake DeSmet has 211,144 A.F. in storage, which is 90% of its total capacity.

Reservoir	Current Storage (Acre-ft)	Total Storage (Acre-ft)	Active Storage (Acre-ft)	Total Storage (%)
Bighorn	3,223	5,756	4,624	56.0
Cross Creek	788	798	798	98.7
Dome Lake No.1	1,496	2,030	1,506	73.7
Kearney Lake	4,453	7,500	6,324	59.4
Park	7,841	12,500	10,362	62.7
Sawmill	1,275	1,831	1,275	69.6

Tongue River Reservoir

With the increase of temperatures and the total remaining snowpack being 0.0 in. for the Tongue River watershed, it is no surprise that the reservoir is at 103.0% full as of May 30, 2023.

81,477 / 79,071 Acre-Ft.
103.0% Full



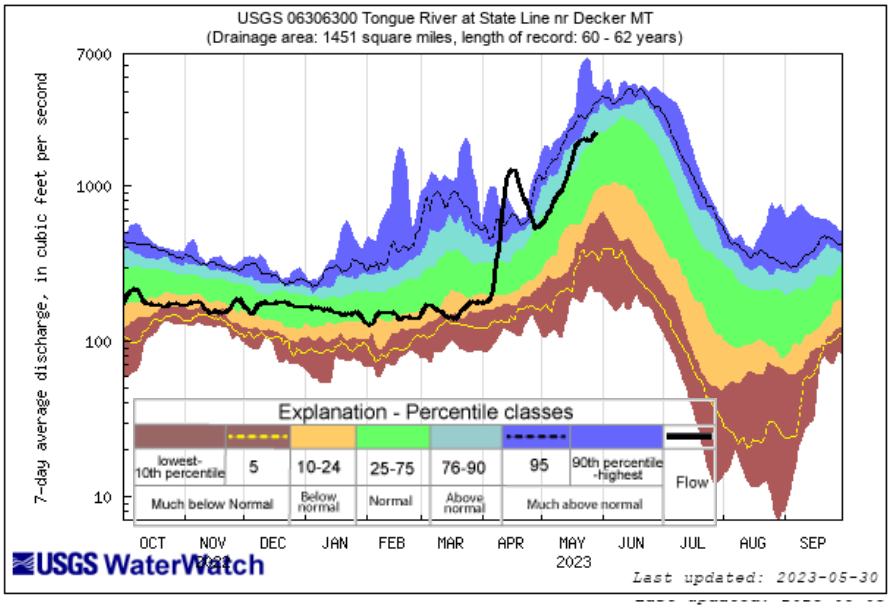
Period of Record: 01/31/1939 - 05/30/2023

Most of the reservoirs affecting the Sheridan Community are still relying on provisional data. During the cold months of the year the gauges are frozen and can not be used. With the warm temperatures the gauges are back up and running.

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/

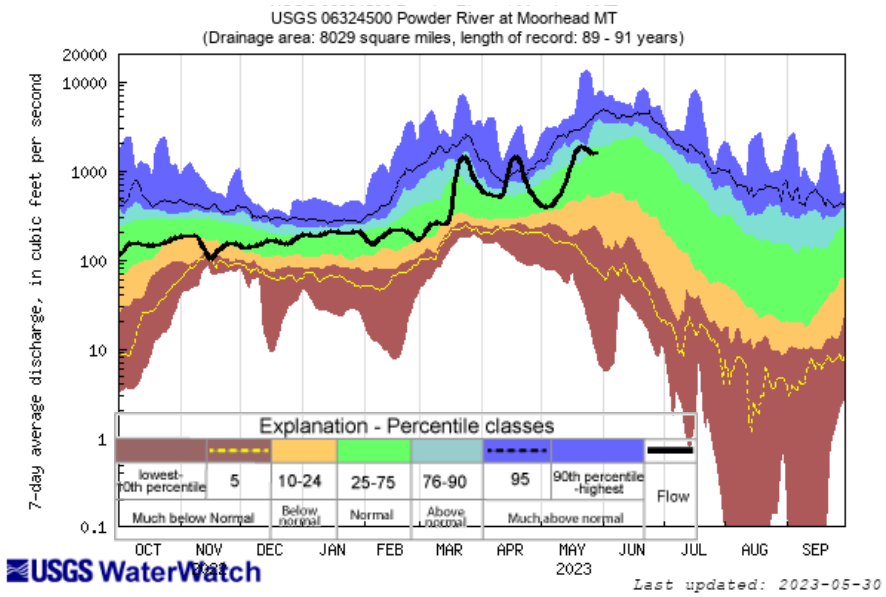
Select Stream Flow Stations

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 the month of May the average discharge was approximately 2990 cfs. This rate has increased since the beginning of the month. Streamflow for the Tongue River is above normal for this time of the year.

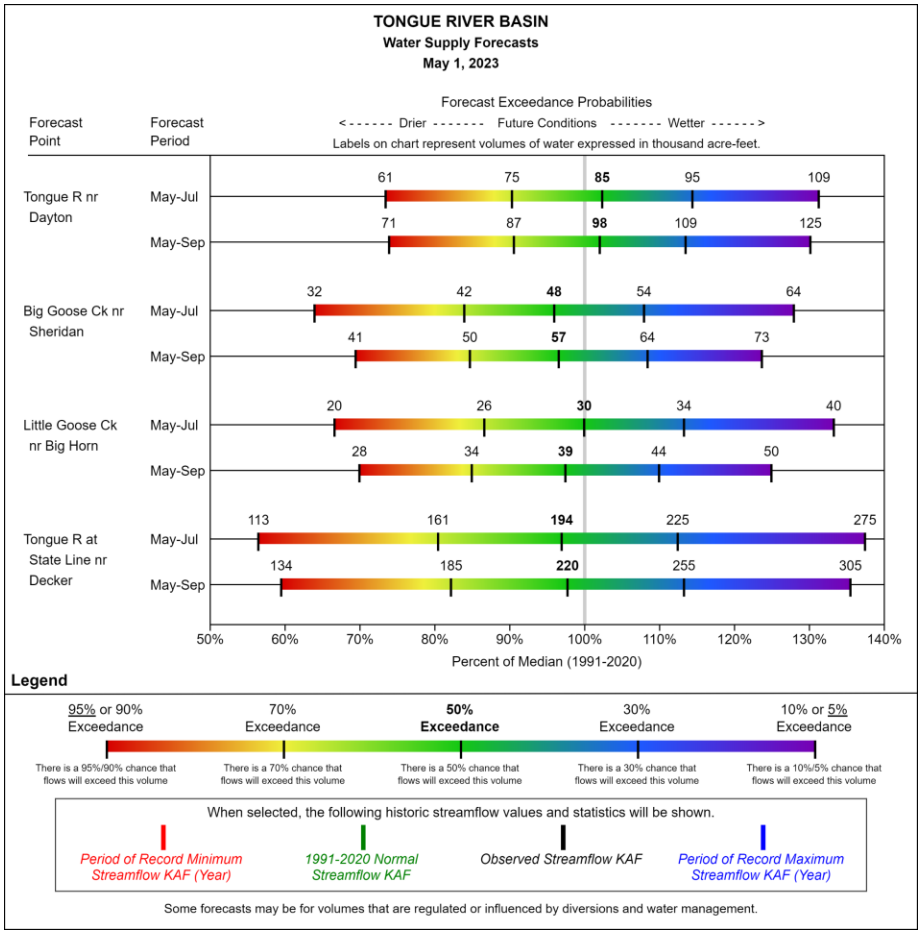
Powder River Border Station Stream Flow: Through out the month of May the average discharge was approximately 1853 cfs. This rate has increased since the begining of the month of May and is in the normal expected amount for this time of year.



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. It's still a 1/10 chance of being below.

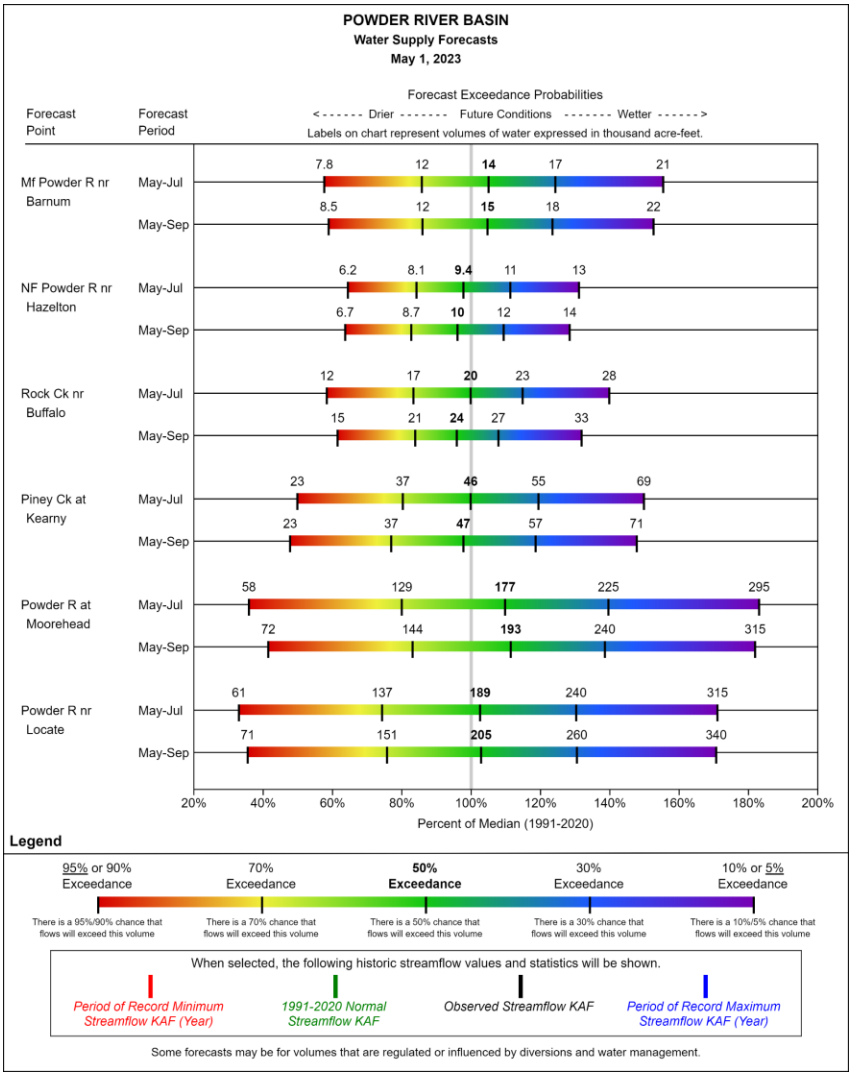


Tongue River Water Supply: In the Tongue River watershed, streamflow is forecast to be close to the 30-year median, with a 50% chance that the amount of water will be more than the median for most sites.

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

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.

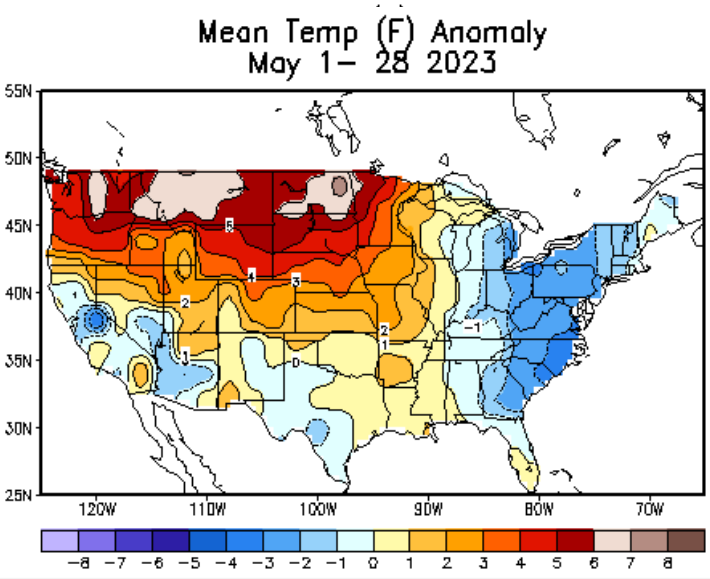


Powder River Water Supply: : In the Powder River Watershed, streamflow is forecast to be close to the 30-year median, with a 50% chance that the amount of water will be more than the median for most sites.

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

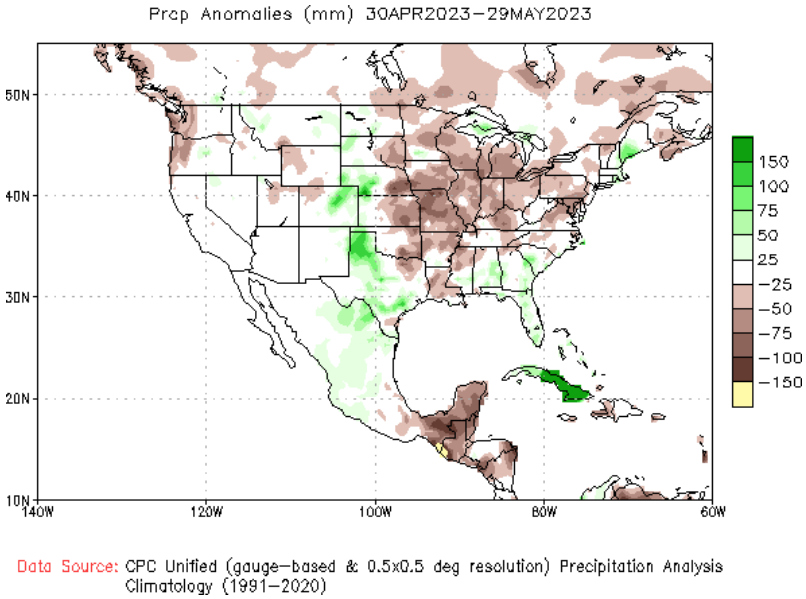
Temperature and Precipitation

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: In May the temperature in Sheridan County was 5-6 degrees higher than the normal range. The average temperature for may in Sheridan is between 55- and 60-degrees Fahrenheit.

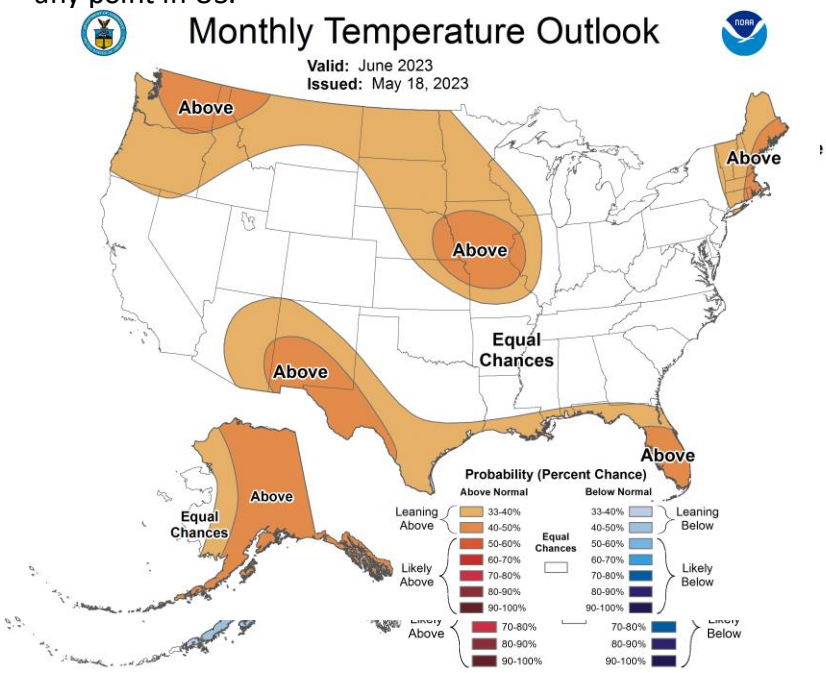
Precipitation: The rainfall for May in Sheridan County was 0 mm below or above what is average for the month. The amount of precipitation that was received through out the month of May was within the normal range for the Sheridan County area.



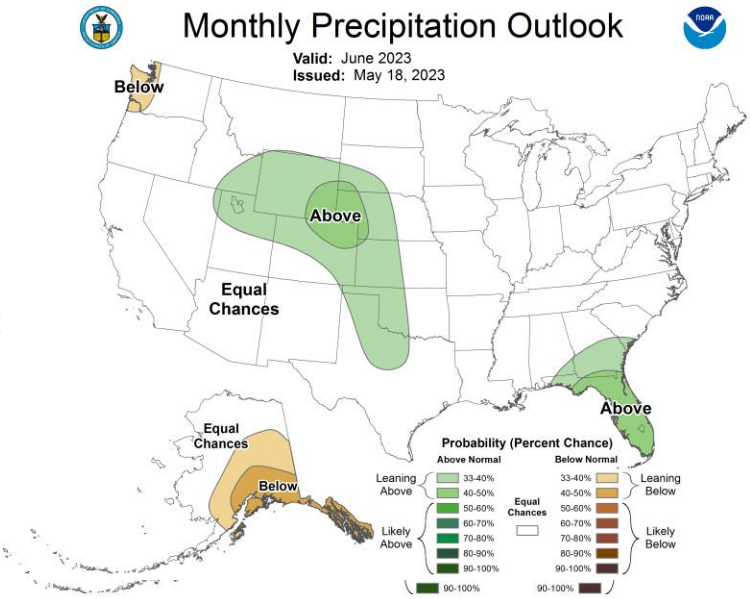
Sources: https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php
https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

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 equal chances of seeing temperatures below or above average for the month of June.

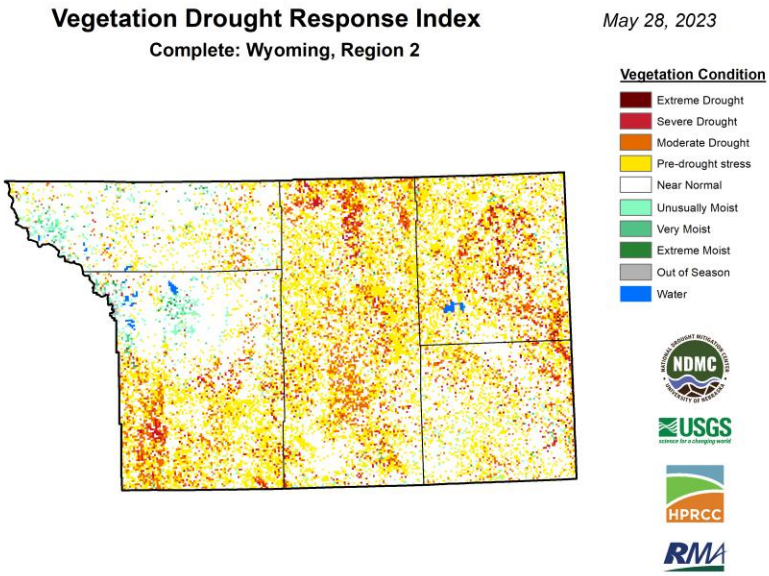


Precipitation: Sheridan County has a 33-40% chance of receiving precipitation above the normal amount for the month of June.

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

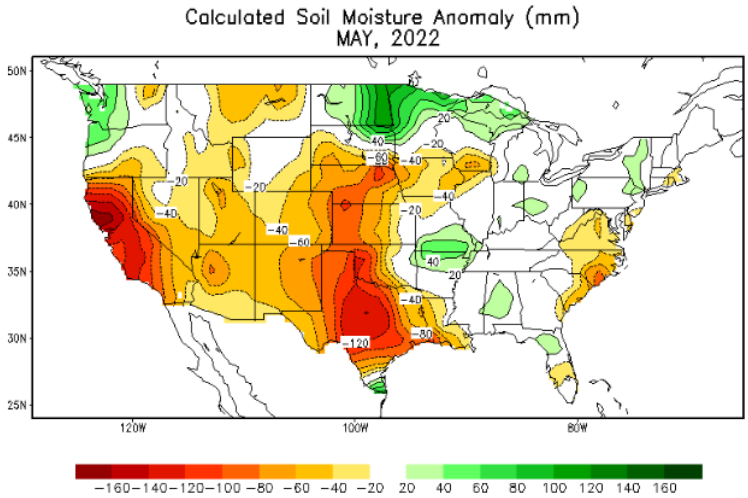
The graphs below are two ways of visualizing on-ground conditions. The vegetation Drought Response Index (Vegdri) uses a satellite to estimate vegetative stress. Soil moisture is helpful when looking at many things. Soil acts as a bank for moisture and can buffer drought degradation or improvement. It 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 is experiencing a variety of vegetation conditions. The majority county is showing pre-drought stress and near normal vegetation conditions.

Soil Moisture:

Soil moisture is within the normal range for Sheridan County, a constant from last month, but eastern Wyoming is currently experiencing lowered soil moisture.



Sources: https://vegdri.unl.edu/Home/VegDRIQuad.aspx?WY,2
https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml