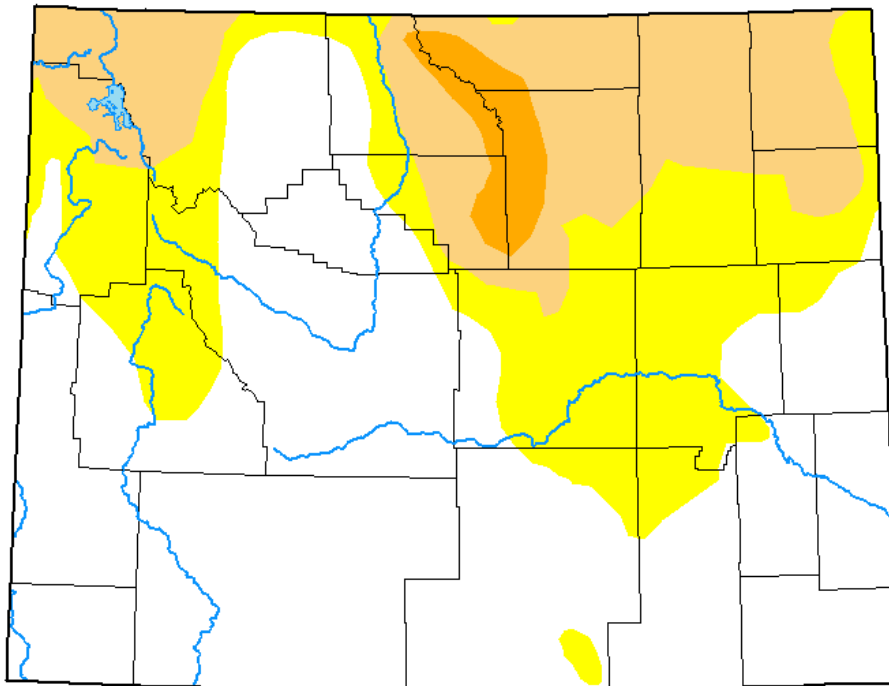


Sheridan County Water Supply Report







May- 2024

U.S. Drought Monitor Wyoming

April 23, 2024
(Released Thursday, Apr. 25, 2024)
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:

David Simeral
Western Regional Climate Center



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.



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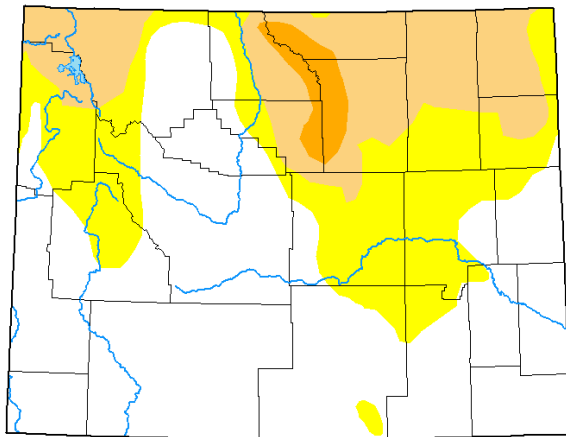
| | |
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Drought Index and Change

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.

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Author:

David Simeral
Western Regional Climate Center

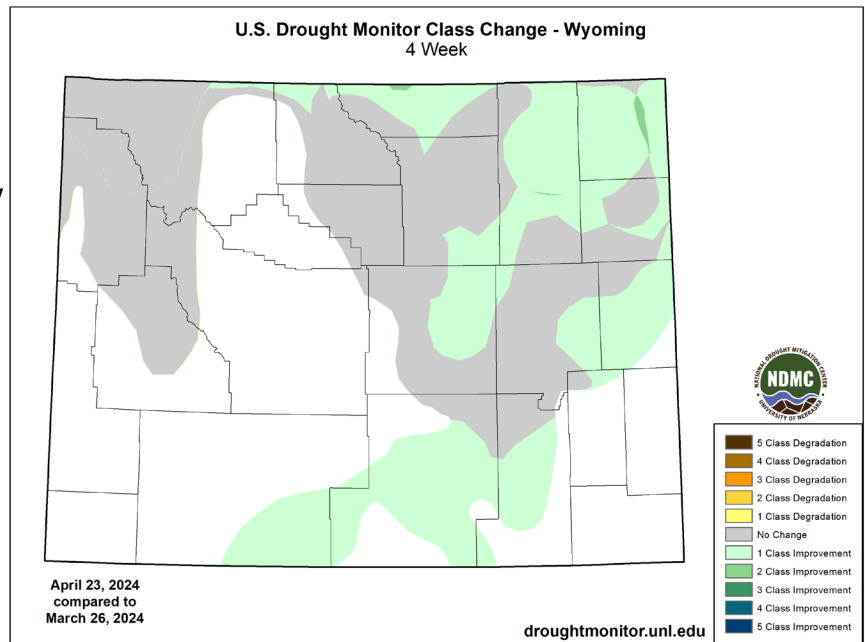


Current Drought Monitor:

Sheridan County is in D1, Moderate Drought, and D2, Severe Drought. The plains are generally experiencing less drought conditions than the mountains, but drought is present across the county.

Change in Drought Monitor:

April showers have made a noticeable impact in reversing the drought trend. Much of the county saw improvement in drought condition. This led to a class 1 improvement, which was not enough to trigger an end of drought conditions but has lessened the severity 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. 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 | 2024-04-23 | 0.00 | 100.00 | 98.48 | 21.40 | 0.00 | 0.00 | 220 |
| Last Week to Current | 2024-04-16 | 0.00 | 100.00 | 98.48 | 21.40 | 0.00 | 0.00 | 220 |
| 3 Months Ago to Current | 2024-01-23 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 100 |
| Start of Calendar Year to Current | 2023-12-26 | 90.06 | 9.94 | 0.00 | 0.00 | 0.00 | 0.00 | 10 |
| Start of Water Year to Current | 2023-09-26 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| One Year Ago to Current | 2023-04-25 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |

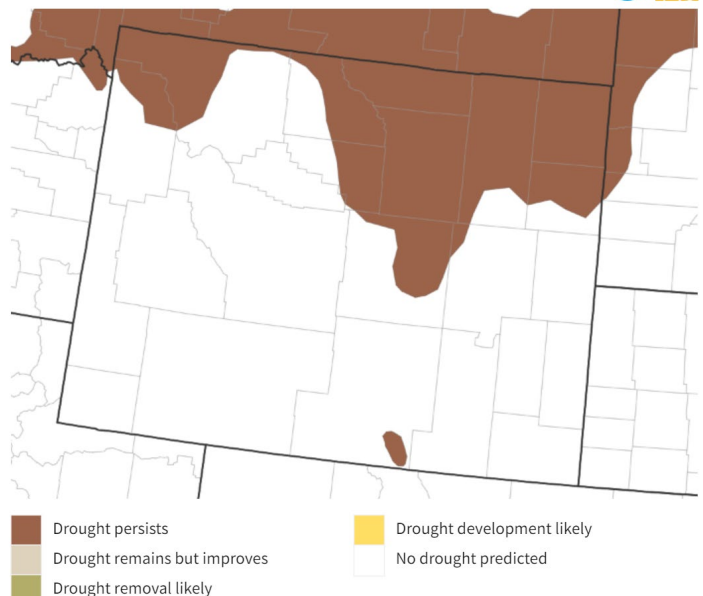
DSCI stands for Drought Severity and Coverage Index. It is “an experimental method for converting drought levels from the U.S. Drought Monitor map to a single value for an area.”

History of Drought Monitor: While drought conditions have declined compared to last year or even three months ago, they improved in early April and have held steady over the last week.

Forecast for Drought Monitor:

Looking into May, NOAA reports: “drought is expected to persist or intensify in drought areas across far western sections of Kansas and the Dakotas, northern Wyoming, and parts of southern and western Colorado. Late April and early May precipitation is expected to be considerably lighter in these areas, and the official monthly precipitation outlook favors neither higher- nor lower-than-normal totals.”¹

U.S. Monthly Drought Outlook



Source(s): Climate Prediction Center
Updates Monthly: 04/26/24

Drought.gov

Sources: 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://droughtmonitor.unl.edu/Summary.aspx>



Precipitation - Tongue River

These graphs represent precipitation affecting the Tongue River. Snow water equivalent (SWE) represents the amount of water contained within the snowpack when it melts.

Snow Water Equivalent and Precipitation in Tongue River Watershed:

Snow-water equivalent is at 77% of median. This puts it in the 15th percentile for the time of year. These conditions are very similar to that of the year 2019.

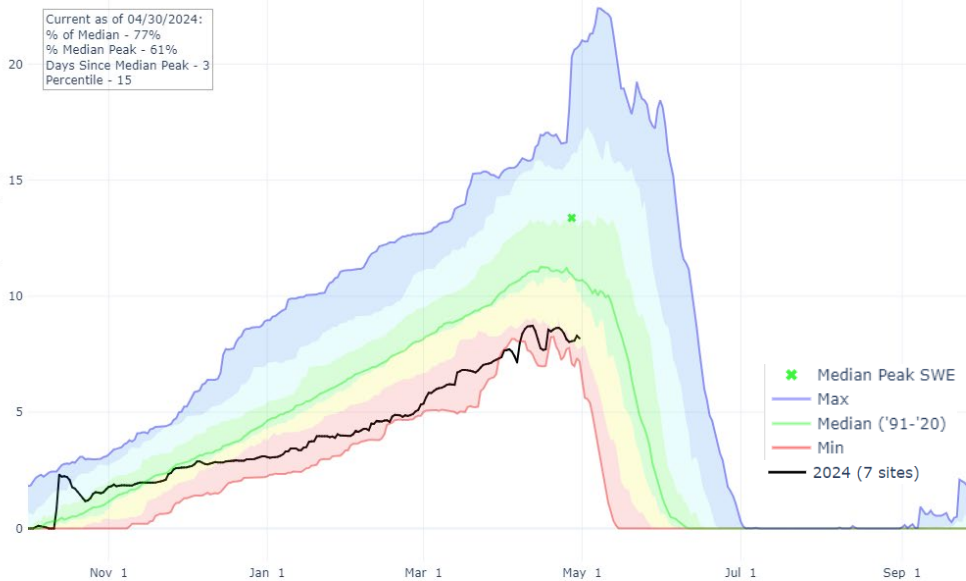
In terms of precipitation, the Tongue River watershed is at 97% of median.

The precipitation is similar to the year 2018 that ended in a below average quantity. Comparing this year to 2019, 2024 has higher levels of precipitation even though SWE was similar.

Reset Range

Link to data: CSV / JSON

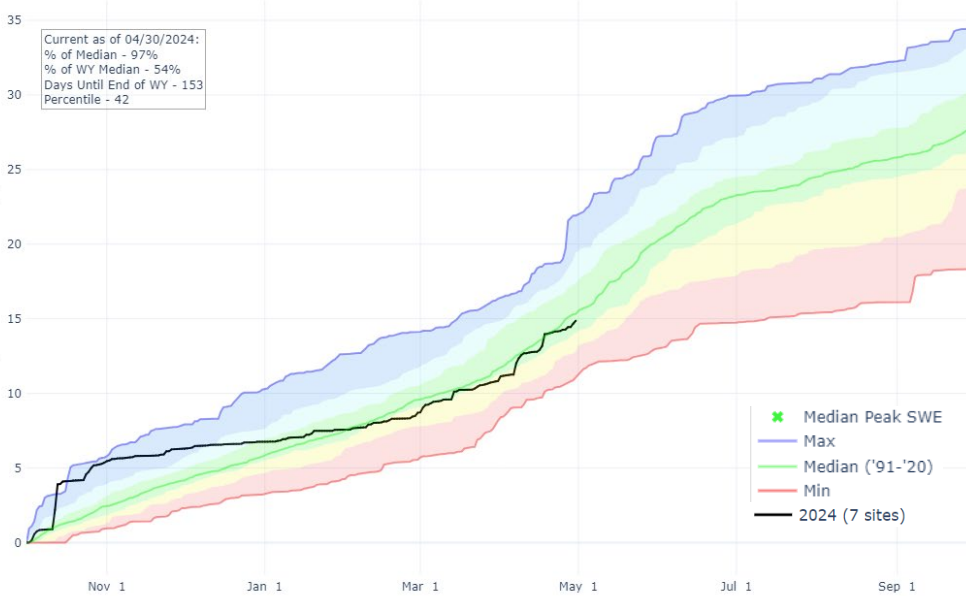
Current as of 04/30/2024:
% of Median - 77%
% Median Peak - 61%
Days Since Median Peak - 3
Percentile - 15



Reset Range

Link to data: CSV / JSON

Current as of 04/30/2024:
% of Median - 97%
% of WY Median - 54%
Days Until End of WY - 153
Percentile - 42



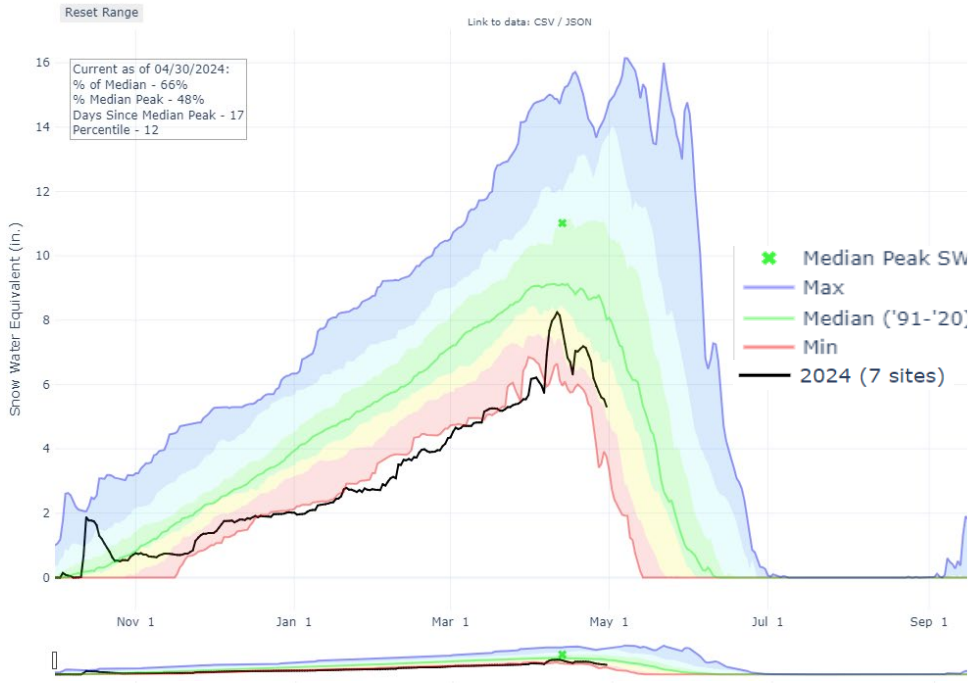
Sources:

- https://nwcc-apps.sc.egov.usda.gov/awdb/basin-plots/POR/WTEQ/assocHUCwy_8/tongue.html
- https://nwcc-apps.sc.egov.usda.gov/awdb/basin-plots/POR/PREC/assocHUCwy_8/tongue.html

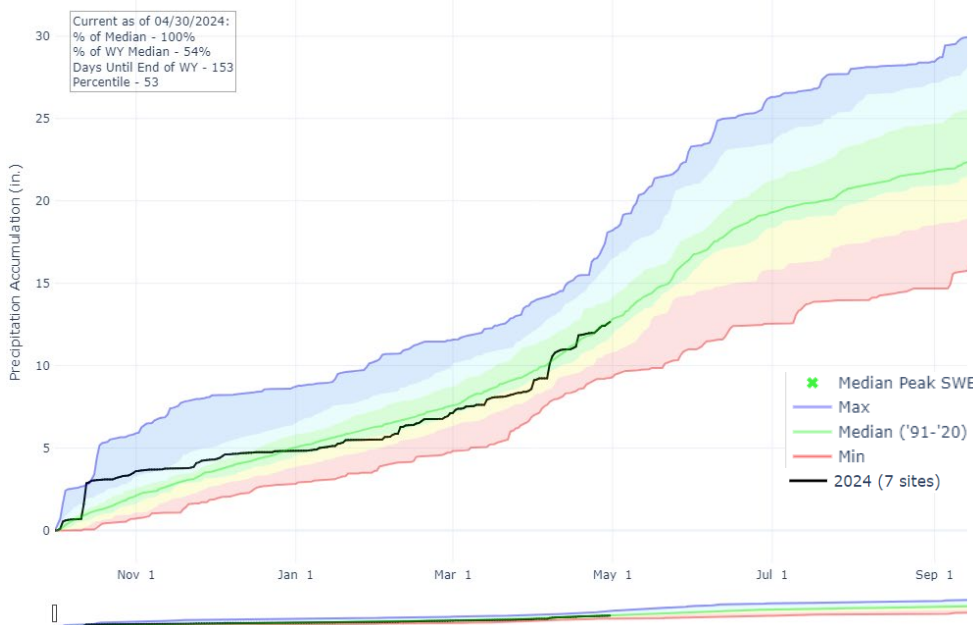


Precipitation - Powder River

These graphs represent precipitation affecting the Powder River watershed. Snow water equivalent represents the amount of water contained within the snowpack when it melts.



Precipitation in Powder River Watershed: Snow Water Equivalent (SWE) is at 66% of median, which is at the 12th percentile. This is an increase from the previous month, thanks to April snow storms. The Snow Water Equivalent is similar to the year 2019.



Precipitation is at 100% of median, in the 53rd percentile. This is an increase from last month. These levels are similar to last year's amount of precipitation at the end of April. 2023 was an above average year for precipitation in the Powder River watershed.

Sources: https://nwcc-apps.sc.egov.usda.gov/awdb/basin-plots/POR/WTEQ/assocHUCwy_8/powder.html
https://nwcc-apps.sc.egov.usda.gov/awdb/basin-plots/POR/PREC/assocHUCwy_8/powder.html



Reservoir Capacity and Stream Flow

The total capacity of reservoirs and current water storage includes inactive storage below the outlet.

Lake DeSmet

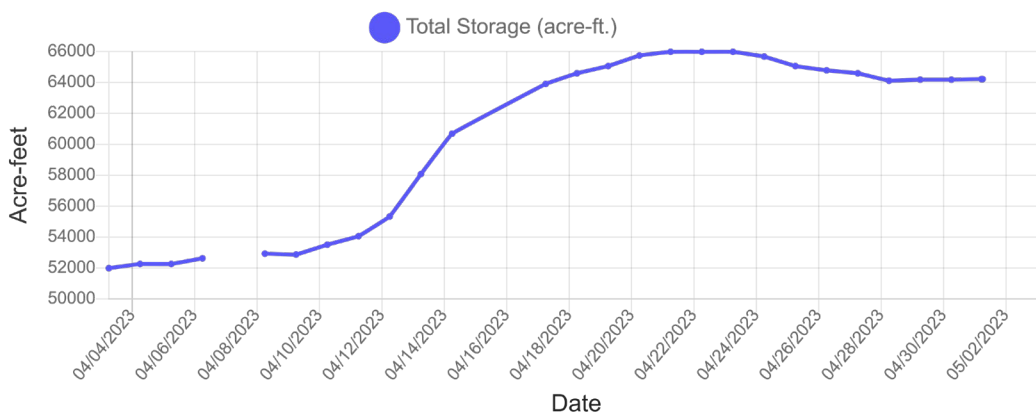
As of May 1, Lake DeSmet has a total of 203,322 acre-feet in storage, an increase of approximately 3,000 feet since April. The intake facility on Piney Creek was turned on April 9th.

| Reservoir | Total Storage (Acre-ft) | Current Storage (Acre-ft) | Percent of Total Capacity (%) |
|-----------------------|-------------------------|---------------------------|-------------------------------|
| Bighorn | 4,624 | 3,685 | 79.7 |
| Cross Creek | 824 | 229 | 27.8 |
| Dome Lake No.1 | 1,506 | 1,333 | 88.5 |
| Kearney Lake | 6,324 | 3,033 | 48.0 |
| Park | 10,362 | 5,376 | 51.9 |
| Sawmill | 1,275 | 943 | 74.0 |

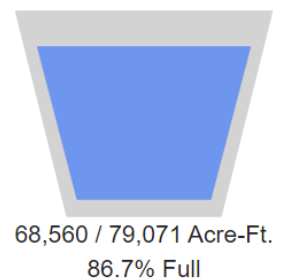
Tongue River Reservoir

Water levels at Tongue River Reservoir increased 13.4% over the last month, from 56,431 acre-feet to 63,976 acre-feet.

Tongue River Reservoir
42B 01900



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. These include but are 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->

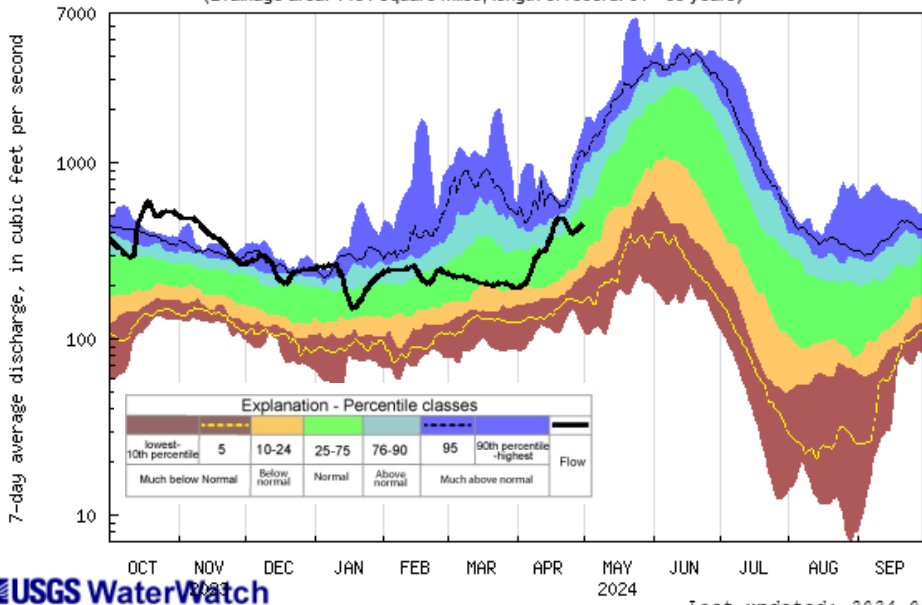
[report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/](https://gis.dnrc.mt.gov/apps/stage/gage-report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/)



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.

USGS 06306300 Tongue River at State Line nr Decker MT
(Drainage area: 1451 square miles, length of record: 61 - 63 years)



Tongue River Border Station Stream Flow

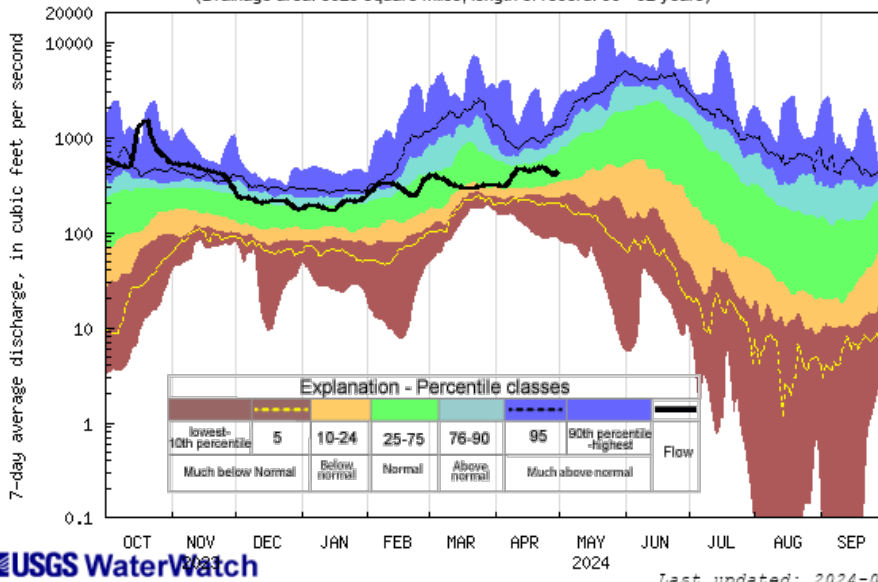
Streamflow has generally remained in the “Normal” range, or 25-75th percentile, as we move into spring. It has moved from the high side of normal to the lower end of normal, so this may change in April.



Powder River Border Station Stream Flow:

After high stream levels in the beginning of the water year, streamflow has decreased into the “Normal” range or 25-75th percentile. In March, streamflow decreased to “below normal” but has since returned.

Last updated: 2024-05-01
USGS 06324500 Powder River at Moorhead MT
(Drainage area: 8029 square miles, length of record: 90 - 92 years)



Last updated: 2024-05-01

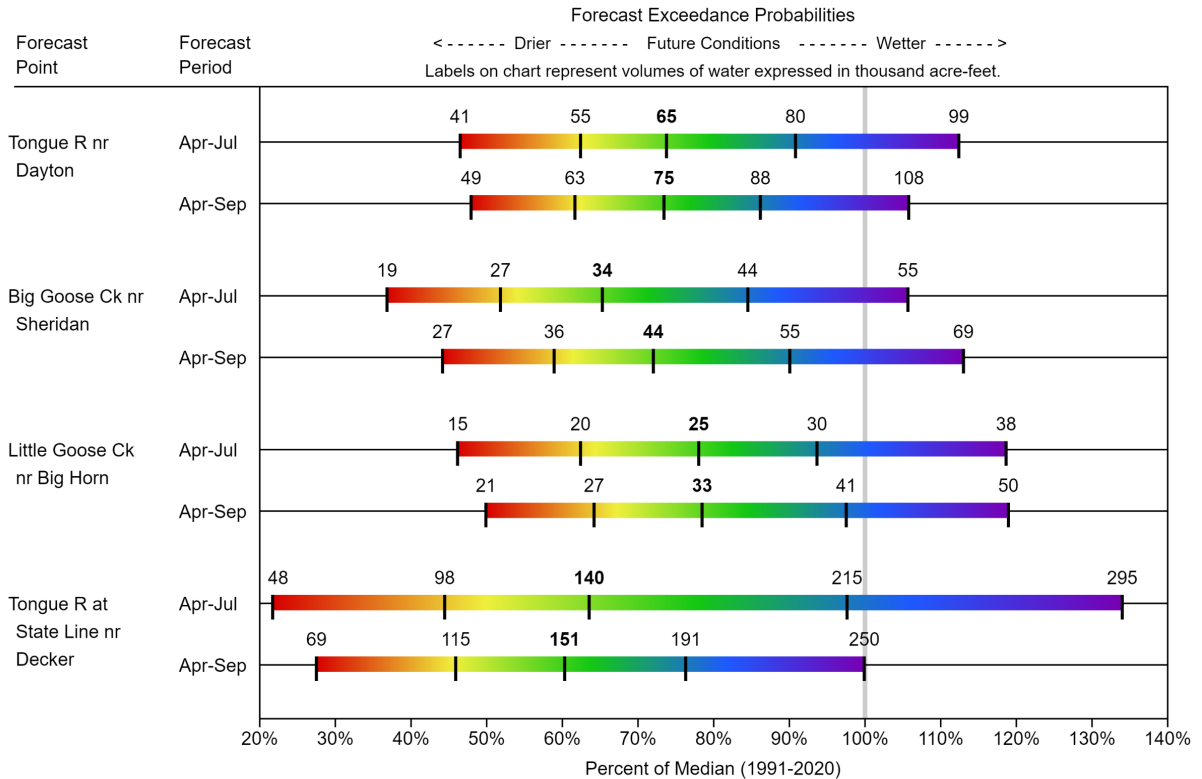
Sources: <https://waterwatch.usgs.gov/index.php?id=mv01d>
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06324500



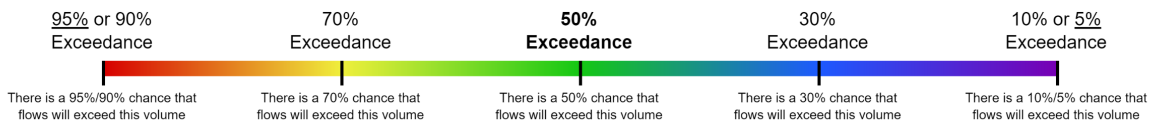
Tongue Water Supply Forecast

This chart takes a while to understand 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 Water Supply Forecasts April 1, 2024



Legend



Tongue River Water Supply: This forecast shows drier conditions are still expected for the Tongue River basin from April to September. For most areas, there is an equal chance of being above or below 70% of median. This is true for both the short term and long term forecasts.

Sources:

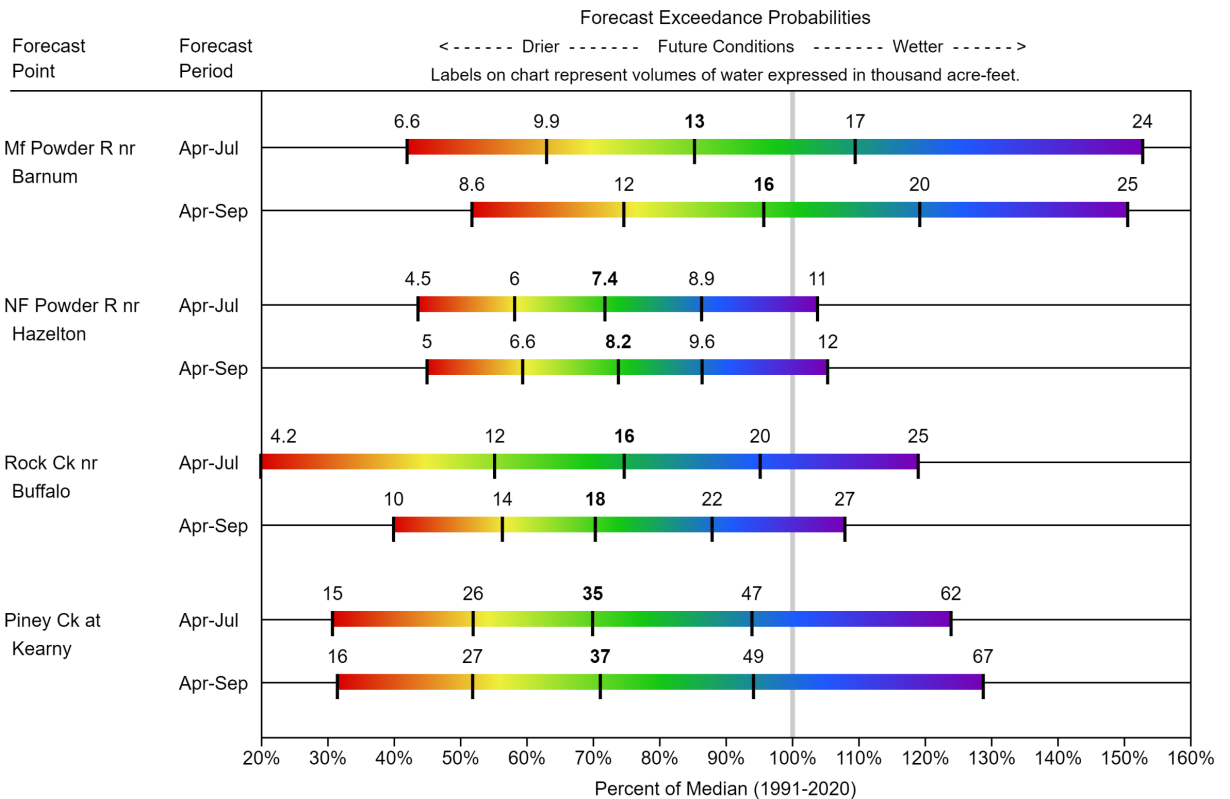
<https://www.nrcs.usda.gov/wps/portal/wcc/home/waterSupply/waterSupplyForecasts/>



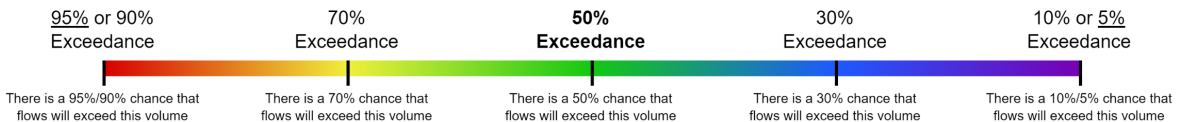
Powder Water Supply Forecast

This chart takes a while to understand but 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 Water Supply Forecasts April 1, 2024



Legend



Powder River Water Supply: Overall, the forecast for the Powder River watershed is better than the forecast for the Tongue River watershed. For most forecast points, there is a 30% chance that flows will exceed 95% of median. The forecast is greater near Barnum, where there is a 50% chance that flows will exceed 95% of median. There is also a greater range of uncertainty at this forecast point.

Sources:

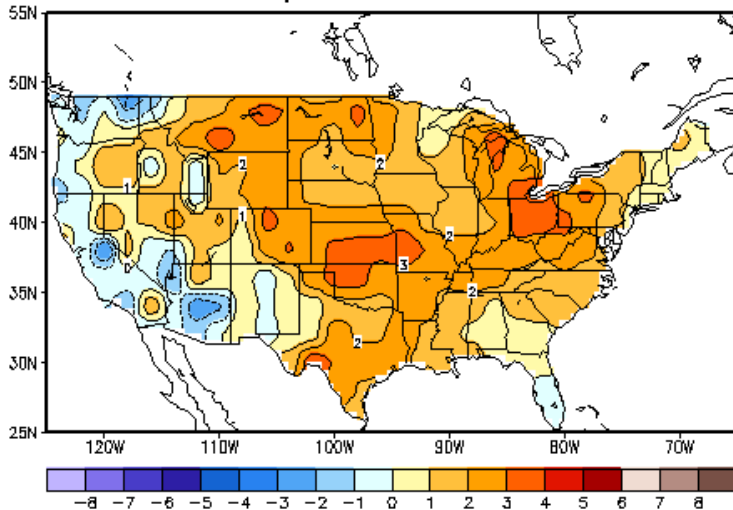
<https://www.nrcs.usda.gov/wps/portal/wcc/home/waterSupply/waterSupplyForecasts/>



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.

Mean Temp (F) Anomaly
Apr 1 – 30 2024

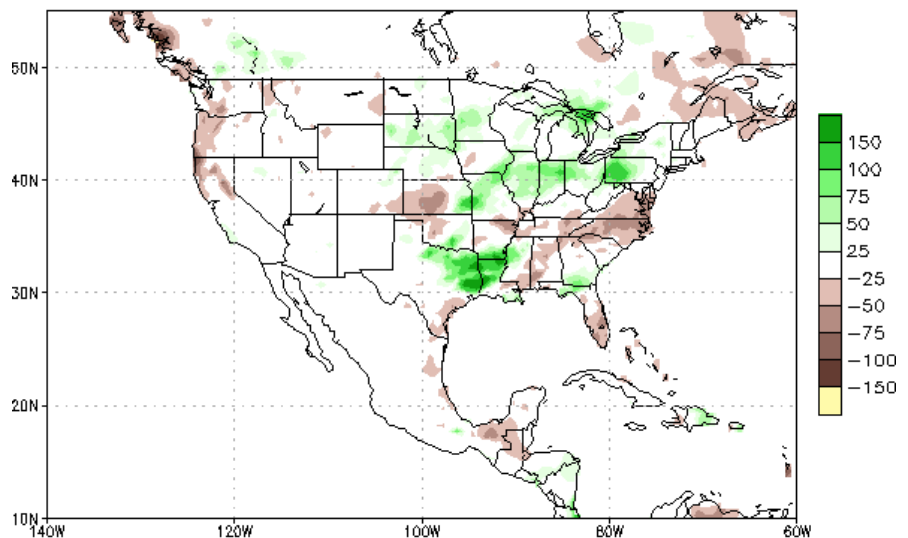


Temperature Anomaly: April was slightly warmer than most years, with a temperature anomaly 2 to 3 degrees above average. The average temperature in April was between 40 and 45 degrees in most of Sheridan County.

Precipitation Anomaly:

The precipitation anomaly for most of Sheridan County was 0 mm, indicating normal or near normal precipitation for April compared to other years.

Prep Anomalies (mm) 01APR2024–30APR2024



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/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php
3 https://www.weather.gov/byz/daily_records?city=Sheridan



Temperature Forecast and Precipitation Forecast

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

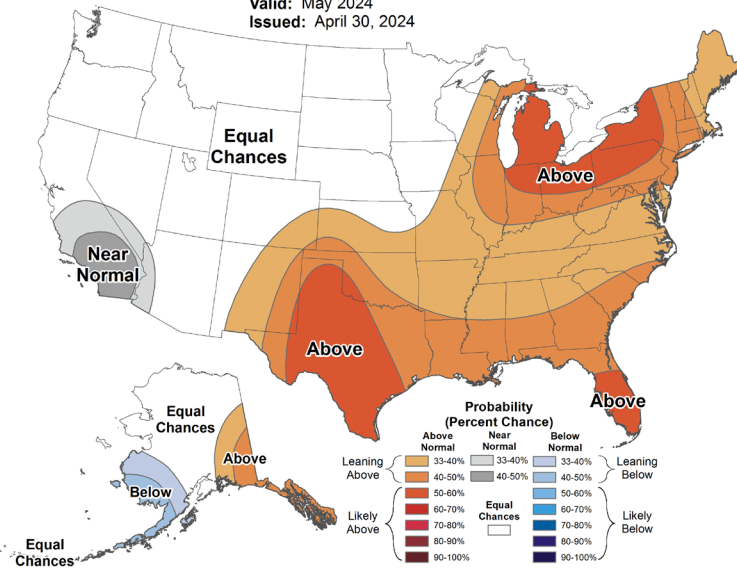
Explore link above for an Interactive map that displays percentage chance above and below normal for any point in US.



Monthly Temperature Outlook



Valid: May 2024
Issued: April 30, 2024



Temperature: Most of Sheridan County is predicted to have equal chances of higher or lower temperature than normal for May, although the northeastern side of the county has a small chance of temperatures above normal.

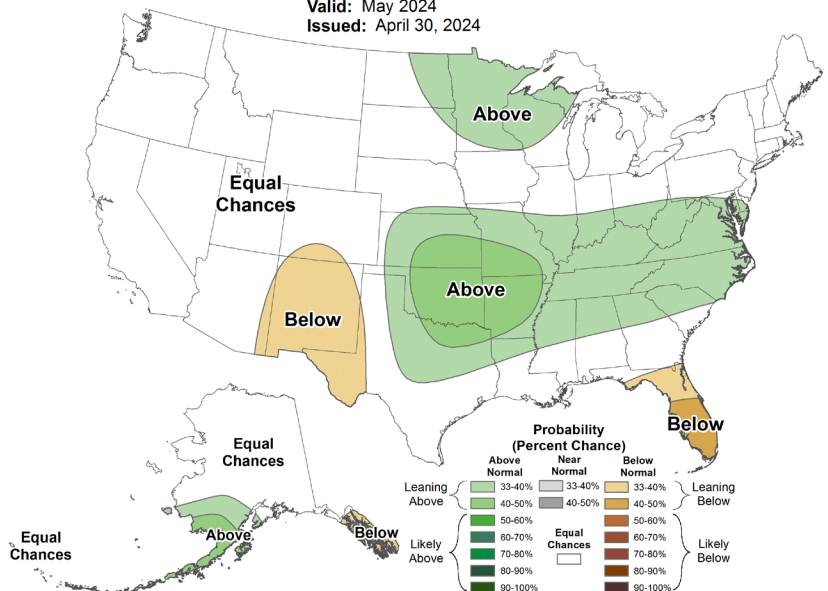


Monthly Precipitation Outlook



Valid: May 2024
Issued: April 30, 2024

Precipitation: There are equal chances forecasted of precipitation being higher or lower than normal for Sheridan County in May, similar to the rest of the state.

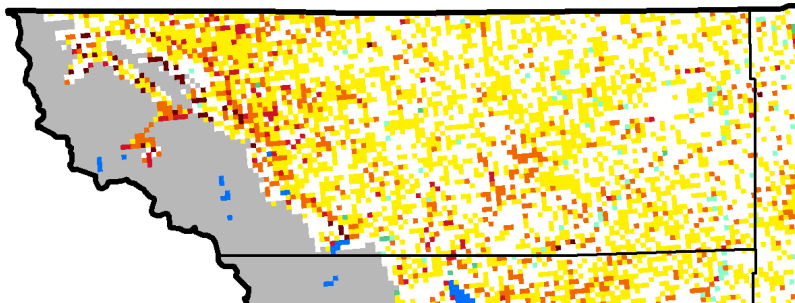


Sources: <https://www.cpc.ncep.noaa.gov/>
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php –
 Interactive with percentages
https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

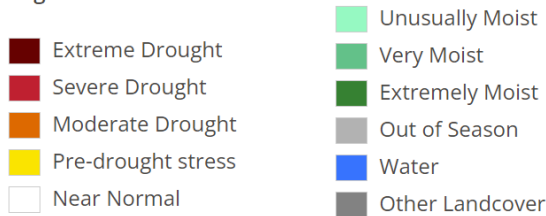


Vegetation Drought Response and Soil Moisture

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 lead to them so is linked to vegetative stress.



Vegetation Condition



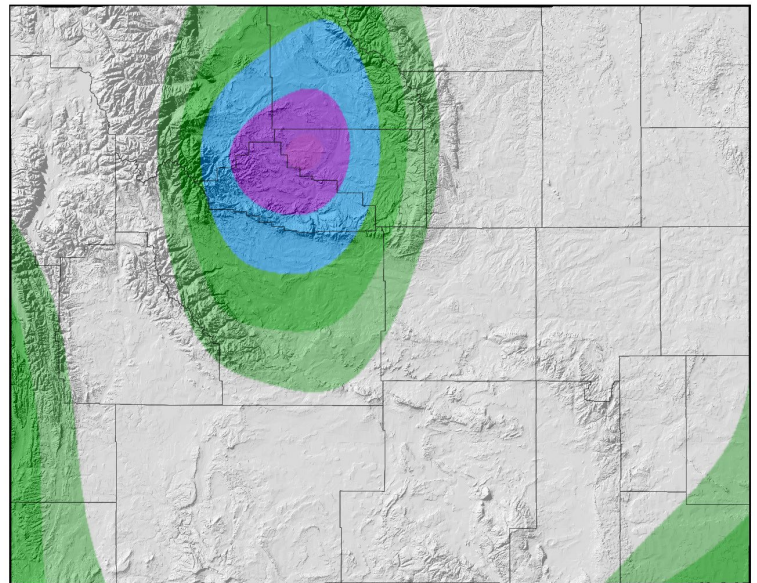
Vegetation Drought Response:

Most vegetation in Sheridan County is showing pre-drought stress, with areas of moderate to extreme drought season in localized areas.

Soil Moisture:

Soil moisture percentile decreases west to east, with mountain soils at 70 to 80% and declining to 40 to 60% on the east side of the county. Light green represents 60 to 70% soil moisture. This is higher than many regions around Sheridan County, although the Bighorn Basin is experiencing a higher soil moisture percentile than the eastern slope.

Soil Moisture Percentile for 30 Apr 2024



Provisional data, subject to revision

Sources: https://vegdiri.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>