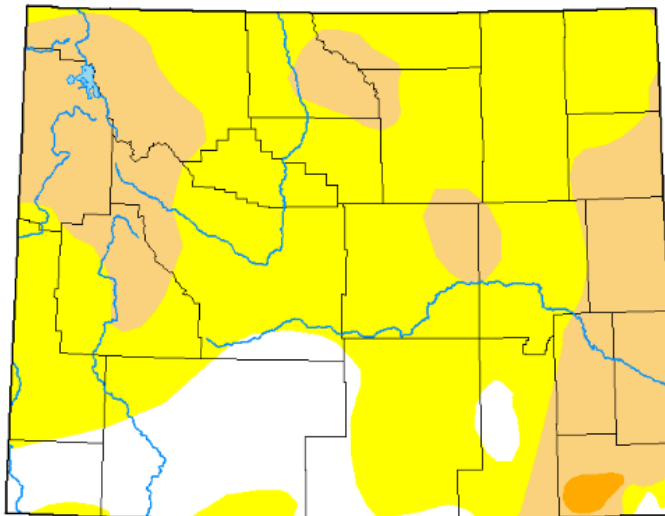


Sheridan County Water Supply Report

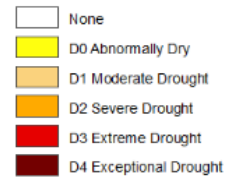
July Report

U.S. Drought Monitor
Wyoming

July 2, 2024
(Released Wednesday, Jul. 3, 2024)
Valid 8 a.m. EDT



Intensity:



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:

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu

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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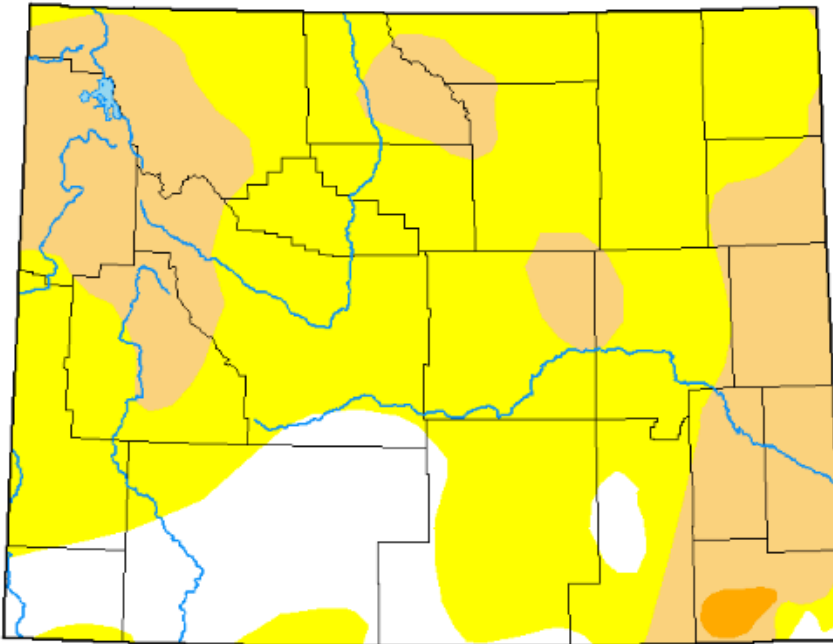
- [Drought Index and Change](#)
- [Drought History and Forecast](#)
- [Precipitation - Tongue River](#)
- [Precipitation - Powder River](#)
- [Reservoir Capacity and Stream Flow](#)
- [Select Stream Flow Stations](#)
- [Tongue Water Supply Forecast](#)
- [Powder Water Supply Forecast](#)
- [Temperature and Precipitation](#)
- [Temperature Forecast and Precipitation Forecast](#)
- [Vegetation Drought Responses and Soil Moisture](#)

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

July 2, 2024
(Released Wednesday, Jul. 3, 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:

Adam Hartman
NOAA/NWS/NCEP/CPC



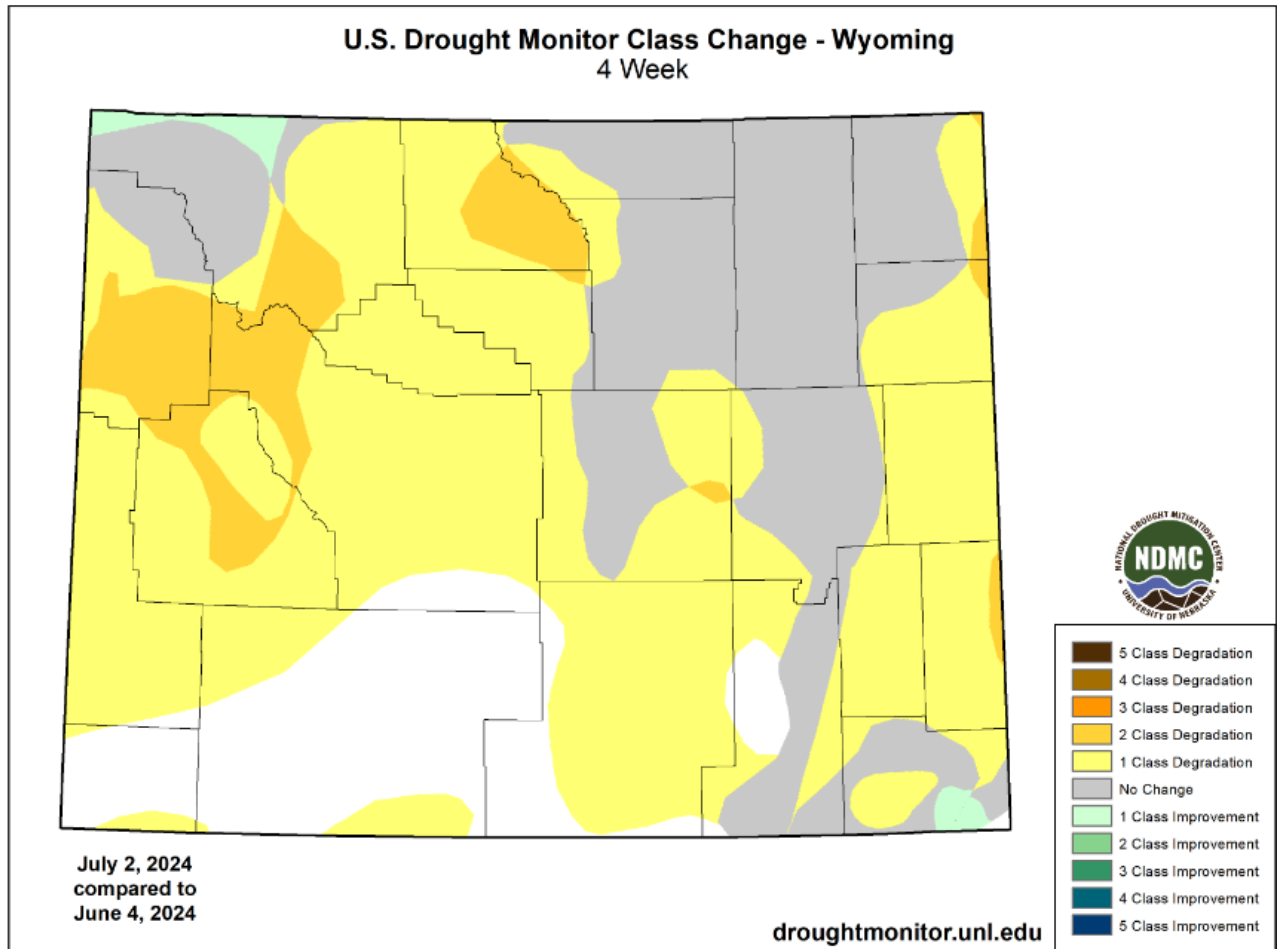
droughtmonitor.unl.edu

Current Drought Monitor

Most of Sheridan County is in D0, Abnormally Dry. The Bighorn Mountains and foothills are experiencing drought conditions.

Change in Drought Monitor

While drought conditions did not improve in Sheridan County, degradation was only season in the Bighorn mountains and foothills. This degradation was Class 1, which is the most minor class of degradation.



Sources:

<https://droughtmonitor.unl.edu/Maps/MapArchive.aspx>

<https://droughtmonitor.unl.edu/Maps/ChangeMaps.aspx><https://droughtmonitor.unl.edu/Summary.aspx>

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Drought History and Forecast

The first half of this page shows current conditions, followed by the forecast. The outlook is a prediction of

Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2024-07-02	0.00	100.00	19.75	0.00	0.00	0.00	120
Last Week to Current	2024-06-25	0.43	99.57	0.00	0.00	0.00	0.00	100
3 Months Ago to Current	2024-04-02	0.00	100.00	100.00	76.29	0.00	0.00	276
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	2023-07-04	100.00	0.00	0.00	0.00	0.00	0.00	0

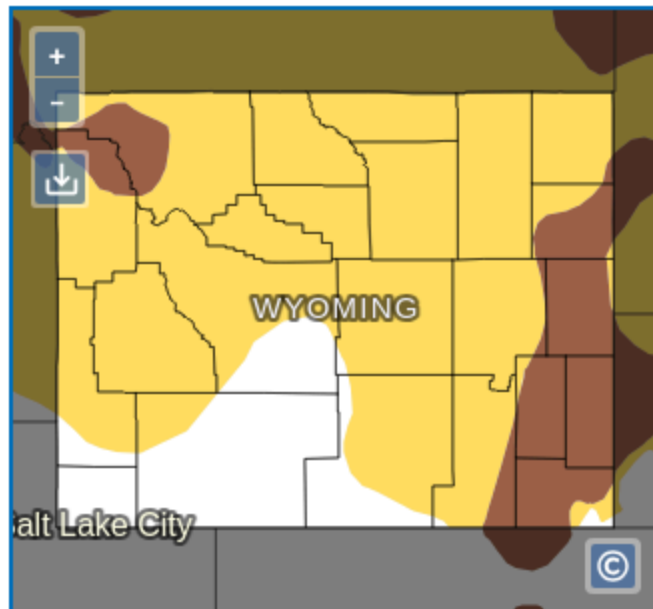
History of Drought Monitor

Drought conditions have improved compared to three months ago, when most of the county was abnormally dry or in moderate drought. Over the last month, conditions improved sufficiently for some of the county to experience no drought conditions. Over the last week, drought has persisted and all of the county is again abnormally dry or experiencing moderate drought.

Forecast of Drought Monitor

Looking into July, NOAA reports: "Persistence is favored for the existing drought across the region, with the potential for additional development in western Dakotas, much of Wyoming and the southeastern portions of the High Plains region, given warmer and drier conditions favored across much of the High Plains during much of July. Additionally, in the climatological context, much of the High Plains region is still in their wettest time of year. However, as July progresses, the drier climatology starts for these western-most areas."¹

Drought Outlooks for Wyoming



Drought Is Predicted To...



DATA VALID: 07/01/24-07/31/24

LAST UPDATED: 06/30/24

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://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

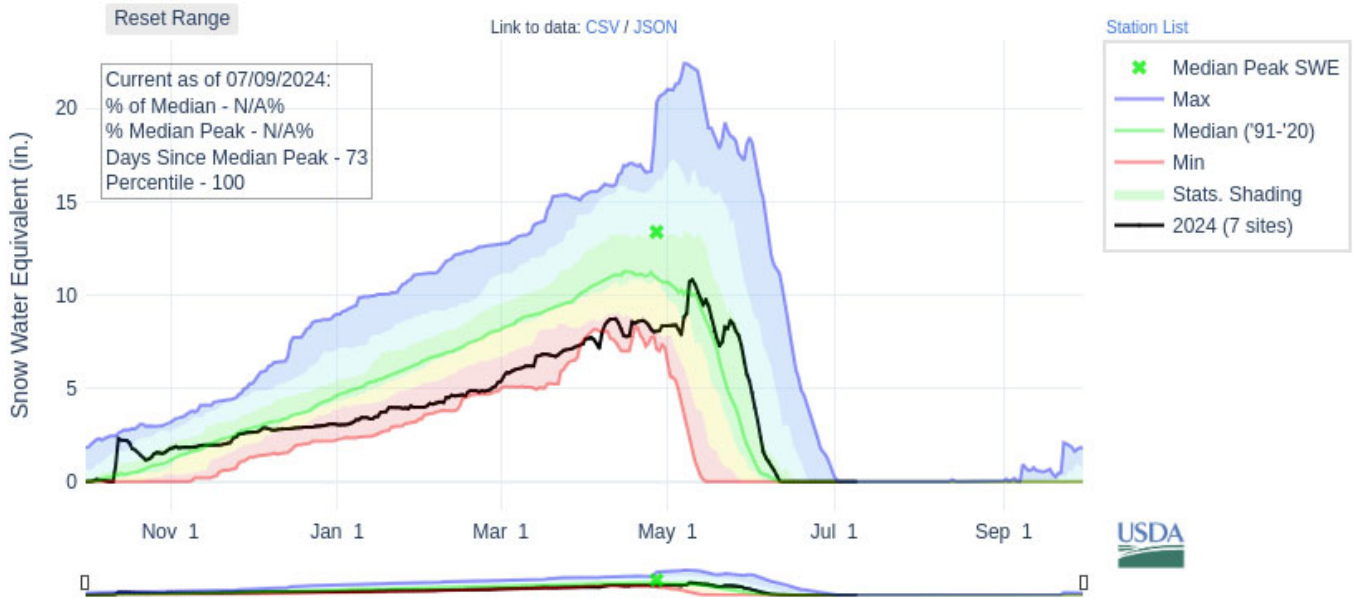
<https://droughtmonitor.unl.edu/Summary.aspx>

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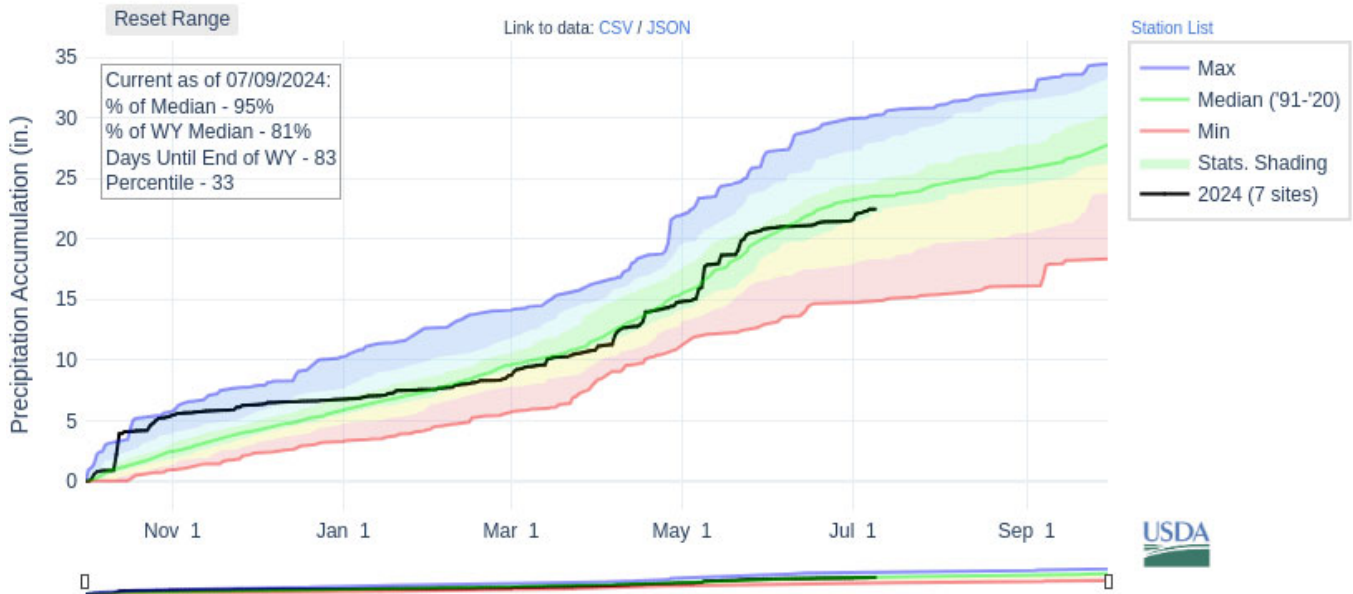
Precipitation - Tongue River

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 IN TONGUE



PRECIPITATION ACCUMULATION IN TONGUE



Summary

Snow-water equivalent is at 0 inches. This is normal for this time of year. Precipitation is at 95% of median, within the normal range. It is in the 33rd percentile.

Sources:

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

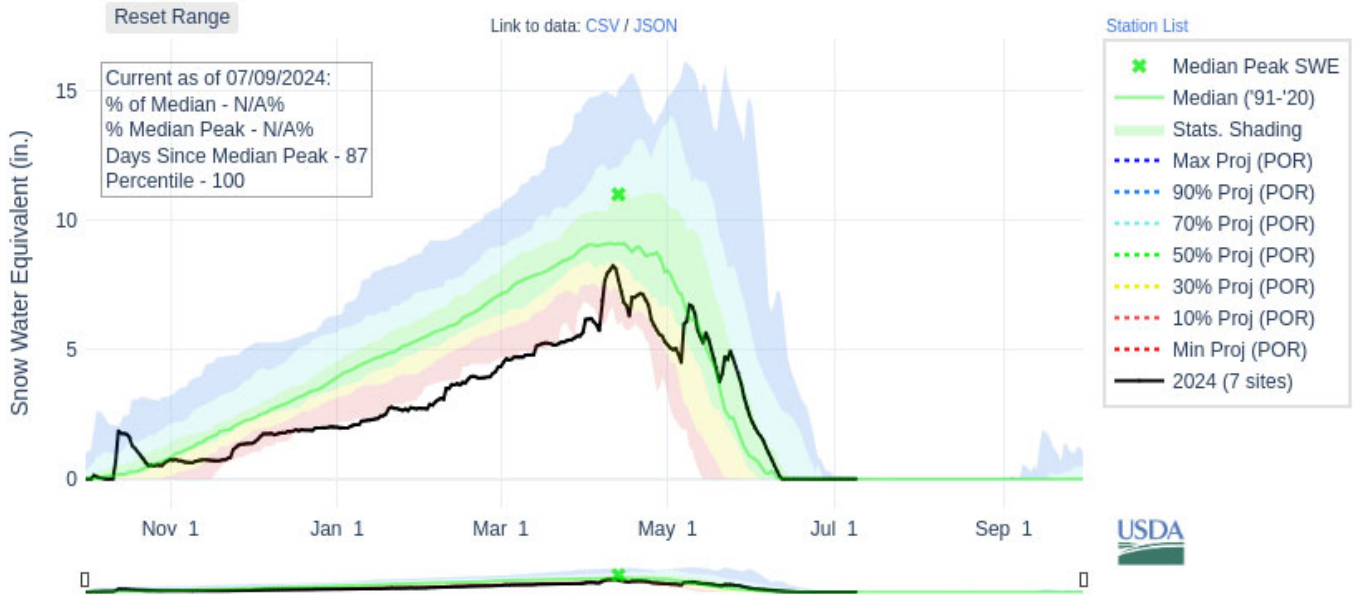
https://nwcc-apps.sc.egov.usda.gov/awdb/basin-plots/POR/PREC/assocHUCwy_8/tongue.htm

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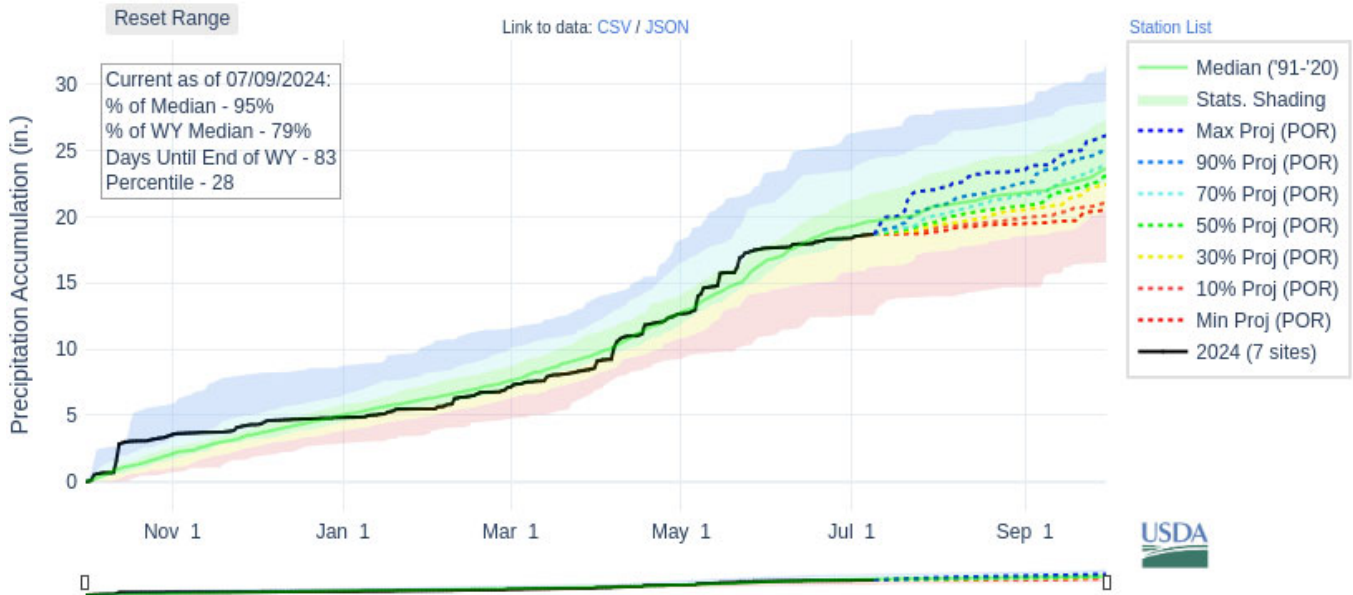
Precipitation - Powder River

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

SNOW WATER EQUIVALENT PROJECTION IN POWDER



PRECIPITATION ACCUMULATION PROJECTION IN POWDER



Summary

Snow Water Equivalent (SWE) is at 0 inches, which is normal for this time of year. Precipitation accumulation is at 95% of median, which is within the normal range. This represents a drier than normal June, which moved precipitation accumulation from above average in May to the bottom of the normal range.

Sources:

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

Reservoir Capacity and Stream Flow

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

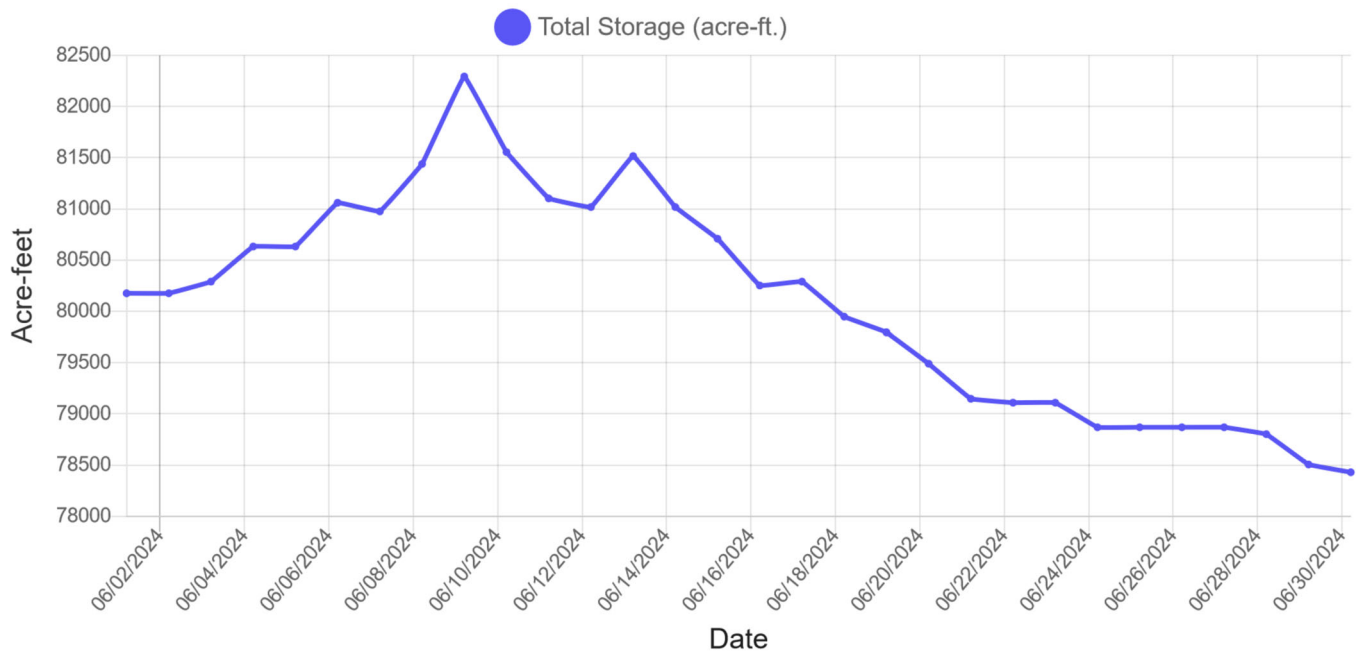
Lake DeSmet

As of July 1, Lake DeSmet has a total of 210,122 acre-feet in storage, a slight decrease since June.

Reservoir	Total Storage (Acre-ft)	Current Storage (Acre-ft)	Percentage of Total Capacity (%)
Bighorn	4,624	4,627	100.1
Cross Creek	824	824	100.0
Dome Lake No. 1	1,506	1,506	100.0
Kearney Lake	6,324	6,324	100.0
Park Lake	10,362	10,362	100.0
Sawmill	1,275	945	74.1

Tongue River Reservoir

Although the reservoir is still overflowing, water levels decreased over the last month from 80,632 acre-feet to 79,147 acre-feet.



Reservoir Level



79,147 / 79,071 Acre-Ft.
100.1% Full

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:

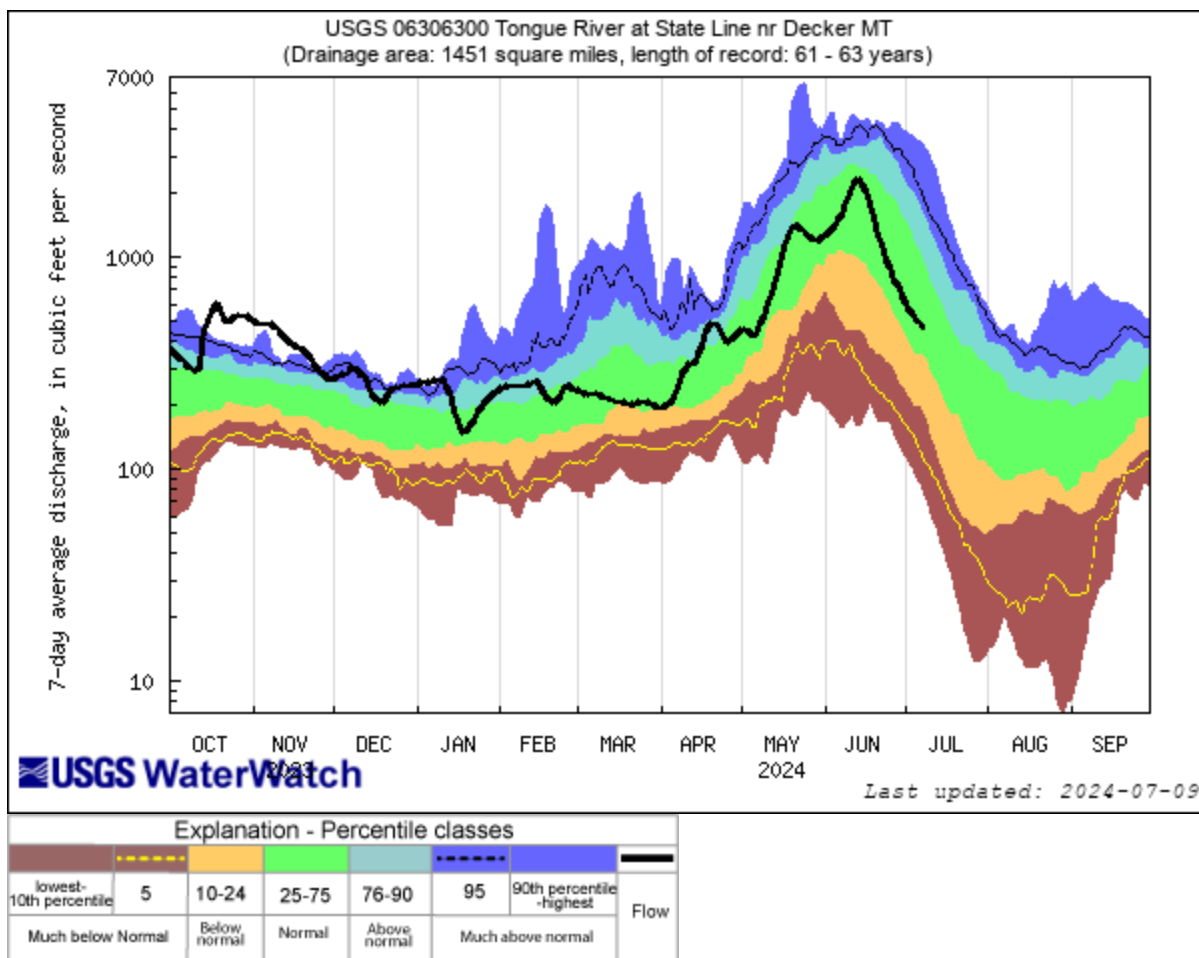
Lake DeSmet Operating Department at lakedesmet@johnsoncowy.us

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

<https://gis.dnrc.mt.gov/apps/stage/gage-report/location/3f087fe86bde421f857dfedff4e40e93/168047640000-168315474000>

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.

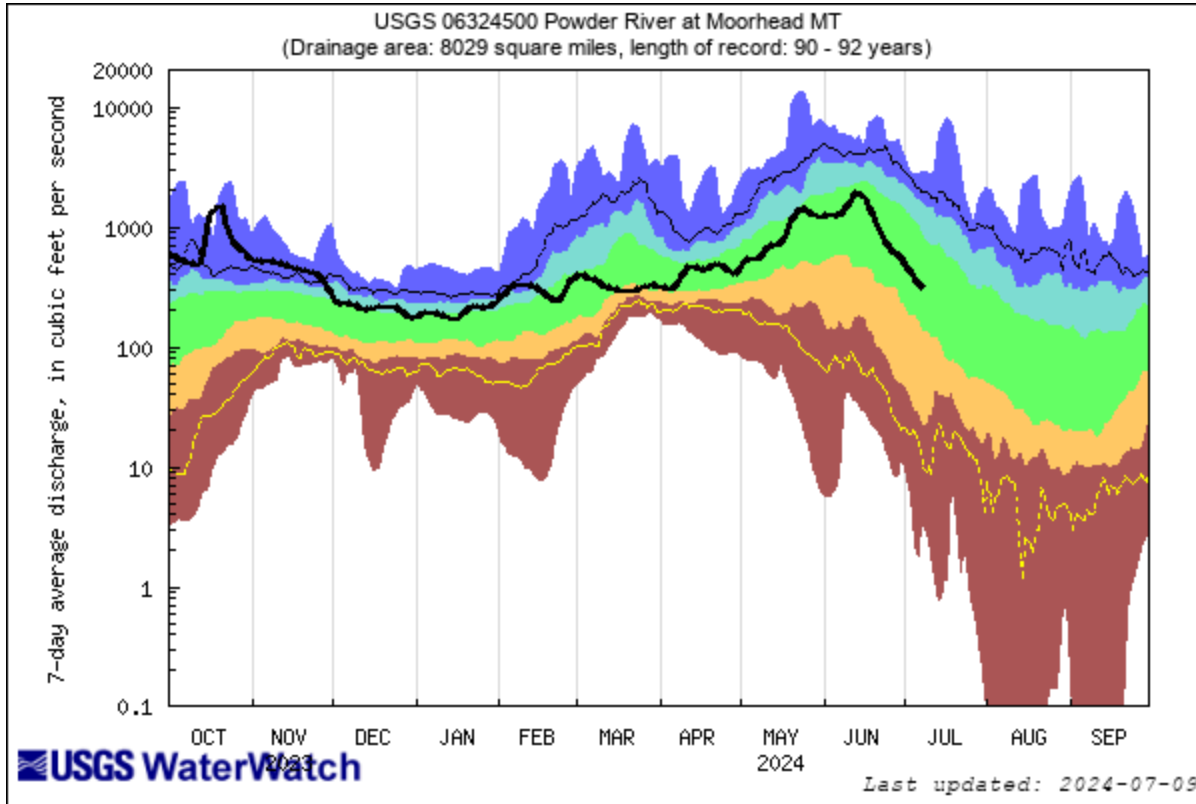


Tongue River Border Station Stream Flow

Streamflow has generally remained in the "Normal" range, or 25- 75th percentile, as we move into summer. Streamflow peaked in June and is now declining.

Powder River Stream Flow

Streamflow is in the "Normal" range or 25-75th percentile. Streamflow decreased more sharply in June than may have been expected, moving streamflow from near the top of the normal range to in the middle of the normal range.



Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow

Sources:

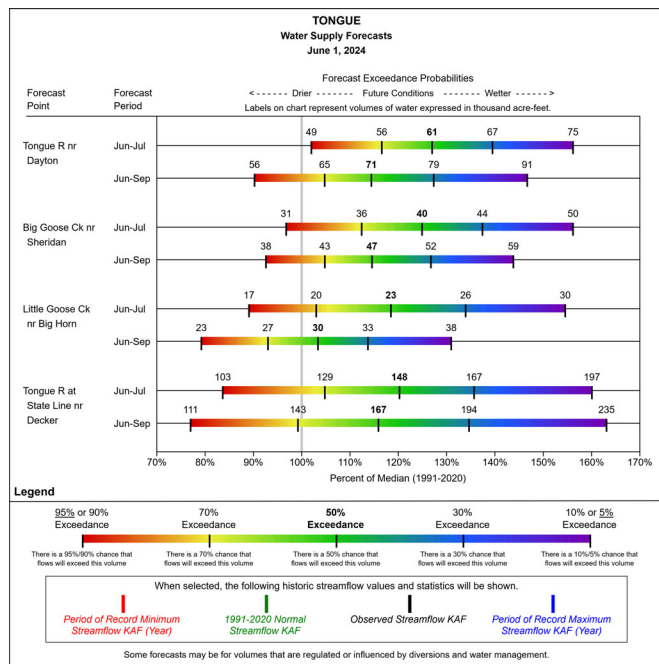
- <https://waterwatch.usgs.gov/index.php?id=mv01d>
- https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300
- https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06324500

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Tongue 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



Tongue River Water Supply

All sites in the Tongue River watershed have above a 70% chance of exceeding median flows for both the short-term and long-term forecast. We can expect flows to be higher than normal, with a 50% chance of exceeding 110-120% of median at most forecast points.

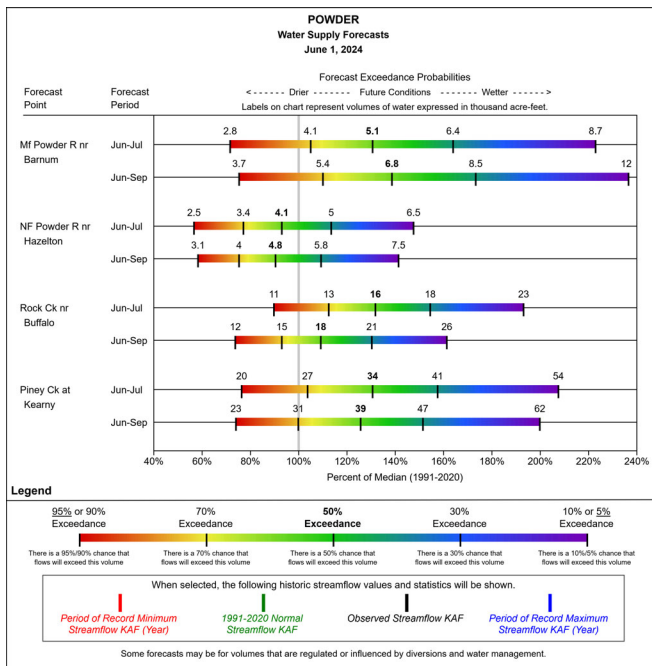
Sources:

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

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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 River Water Supply

The June to July and June to September forecast has above a 70% chance that flows will exceed median for most sites. Flows have a lower chance of exceeding median at the North Fork of the Powder River near Hazelton, where there is less than a 50% chance of flows exceeding median. However, elsewhere in the Powder River watershed, flows are expected to be at or higher than normal.

Sources:

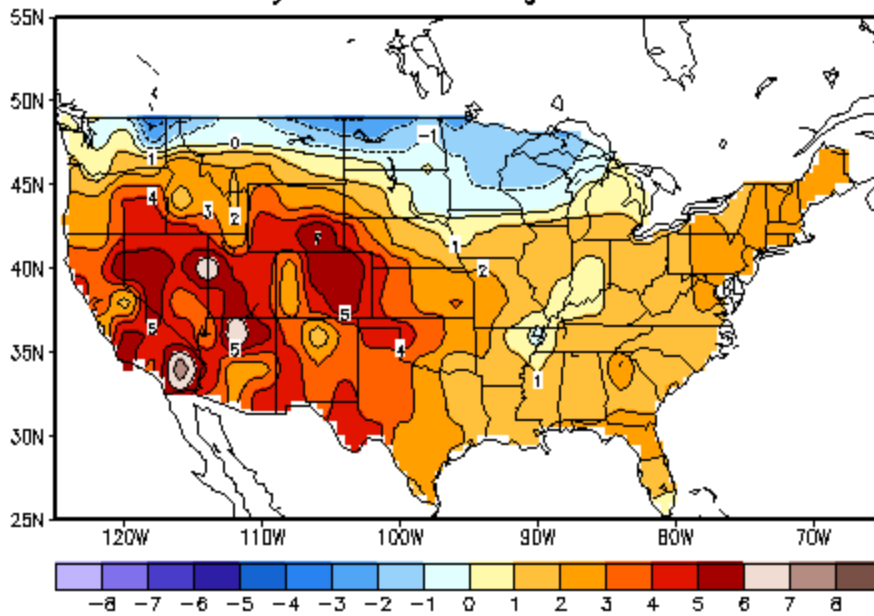
<https://www.nrcs.usda.gov/wps/portal/wcc/home/waterSupply/waterSupplyForecasts/>

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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 30-day mean ending Jul 01 2024



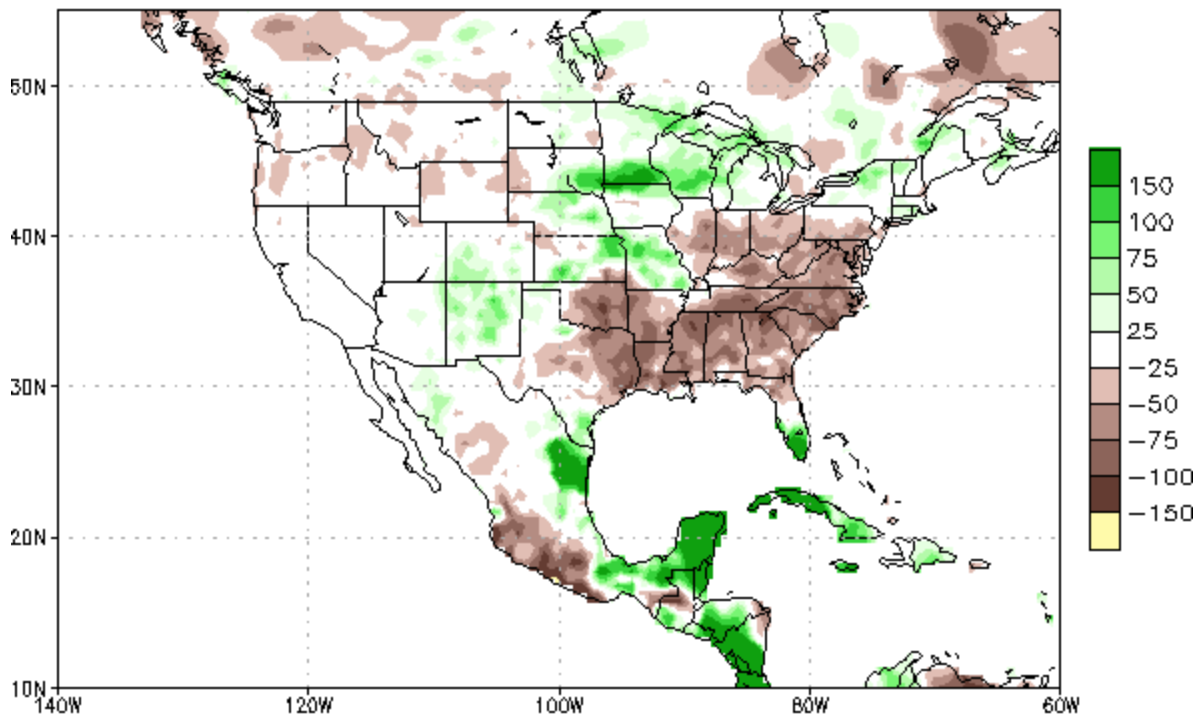
Temperature Anomaly

June was warmer than most years, with a temperature anomaly 2 to 3 degrees higher than usual.

Precipitation Anomaly

The precipitation anomaly for most of Sheridan County was 0 mm, indicating normal or near normal precipitation for June compared to other years. The Bighorn Mountains and foothills experienced an anomaly near 25 mm less than usual.

Prcp Anomalies (mm) 07JUN2024-06JUL2024



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/NAM_S_precip_monitoring.shtml2

https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php3

https://www.weather.gov/byz/daily_records?city=Sheridan

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Temperature Forecast and Precipitation Forecast

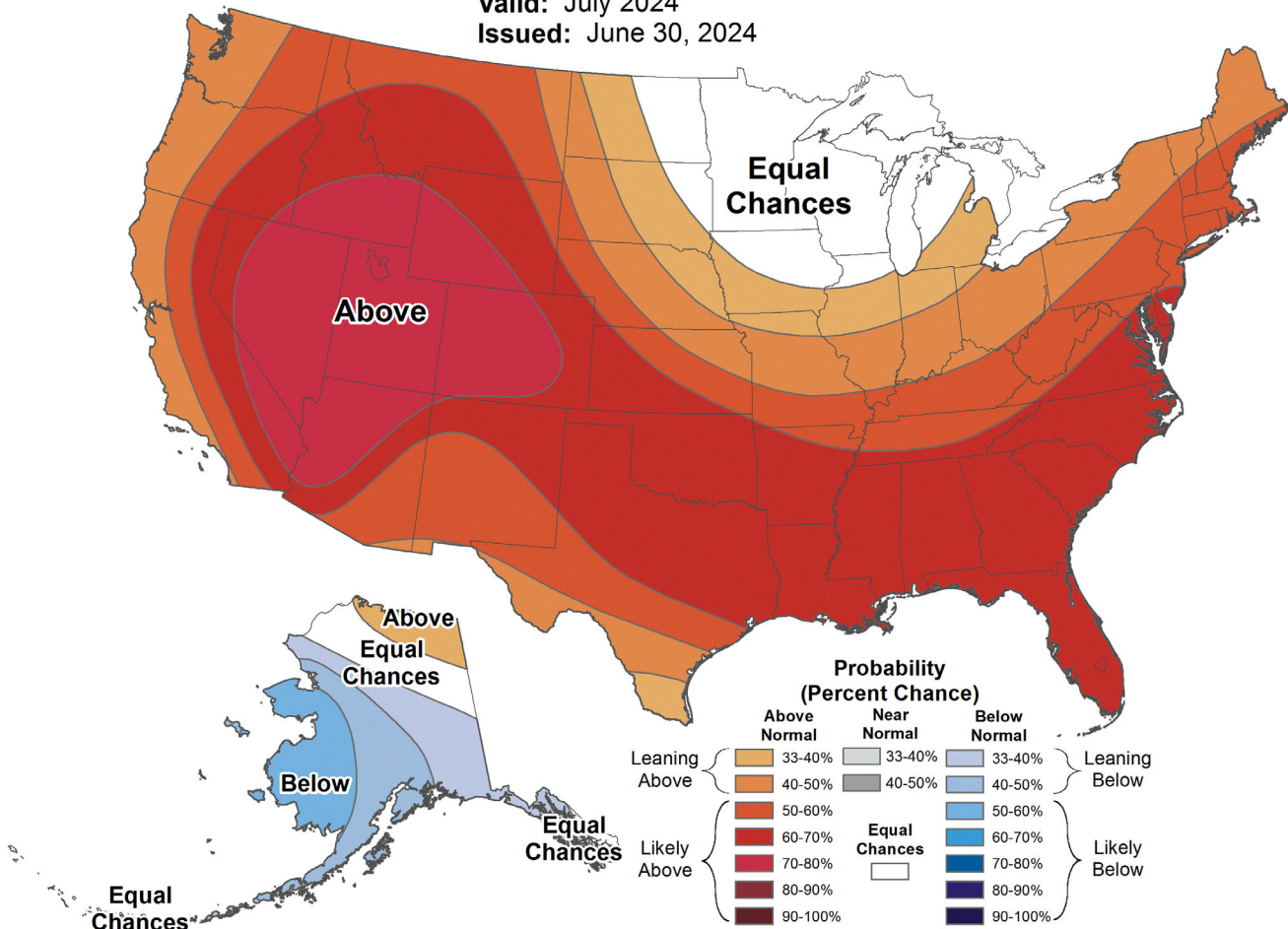
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php Explore link above for an Interactive map that displays percentage chance above and below normal for any point in US



Monthly Temperature Outlook



Valid: July 2024
Issued: June 30, 2024



Temperature

Sheridan has 60-70% probability of temperature above normal for July. There is 0% chance it will be below average.

Precipitation

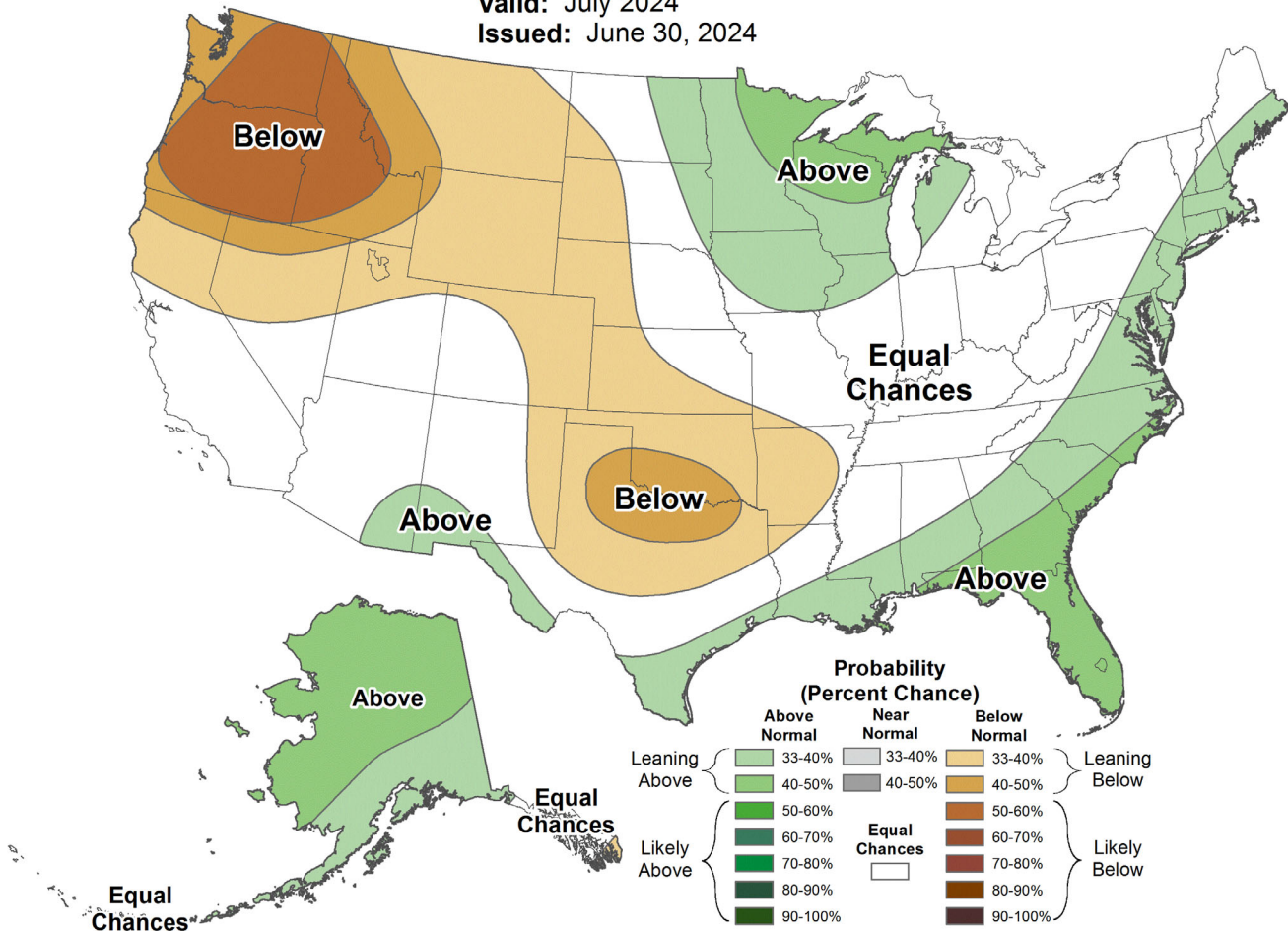
Sheridan County has a 33-40% probability of precipitation being below normal in July, indicating a hot and dry month ahead.



Monthly Precipitation Outlook



Valid: July 2024
Issued: June 30, 2024



Sources:

<https://www.cpc.ncep.noaa.gov/>

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

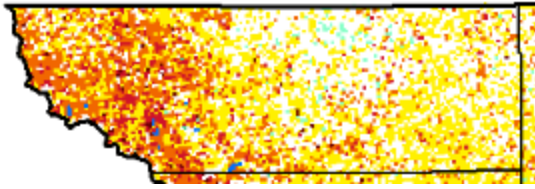
https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

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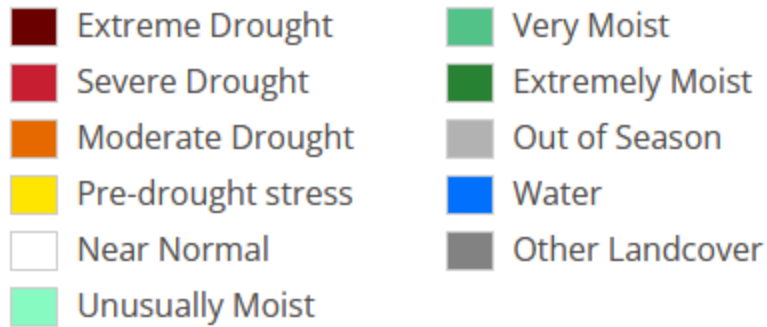
Vegetation Drought Responses and Soil Moisture

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 Condition



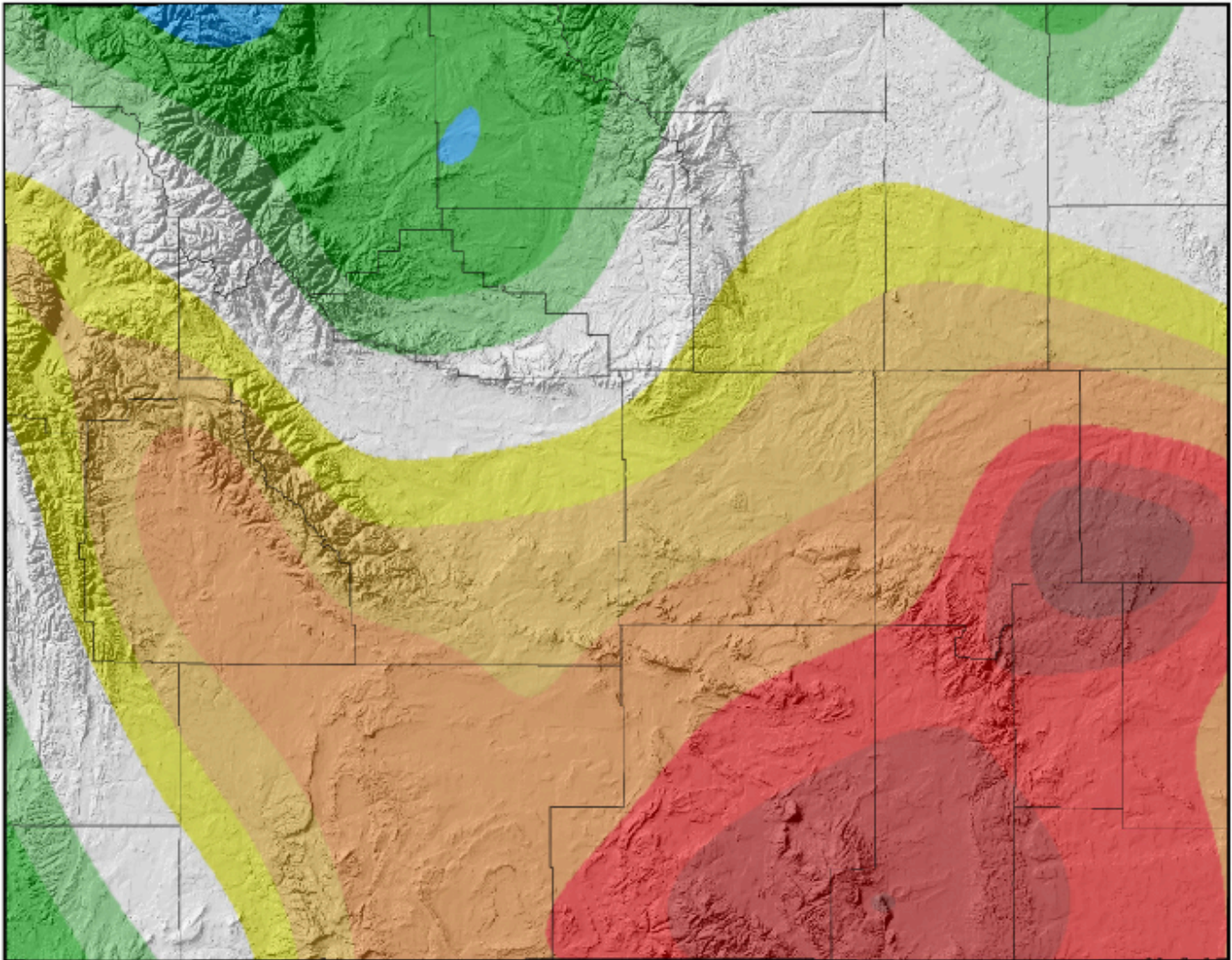
Vegetation Drought Response

Vegetation across the county is showing pre-drought to moderate or severe drought stress. The more severe drought stress is seen on the western side of the county. Pockets of unusually moist conditions persist in isolated areas within the center of the county.

Soil Moisture

Soil moisture percentile decreases west to east, with mountain soils at 60 to 70% and declining to 40 to 60% on the east side of the county. This is contradictory to the vegetative stress seen in the graph above, and the drought conditions seen across the county. This is also an increase in soil moisture percentile across the county compared to last month

Soil Moisture Percentile for 06 Jul 2024



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 07 Jul 2024 <http://www.wrds.uwyo.edu>

Sources:

<https://vegdi.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.htm>

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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>