Sheridan County Water Supply Report

February - 2024

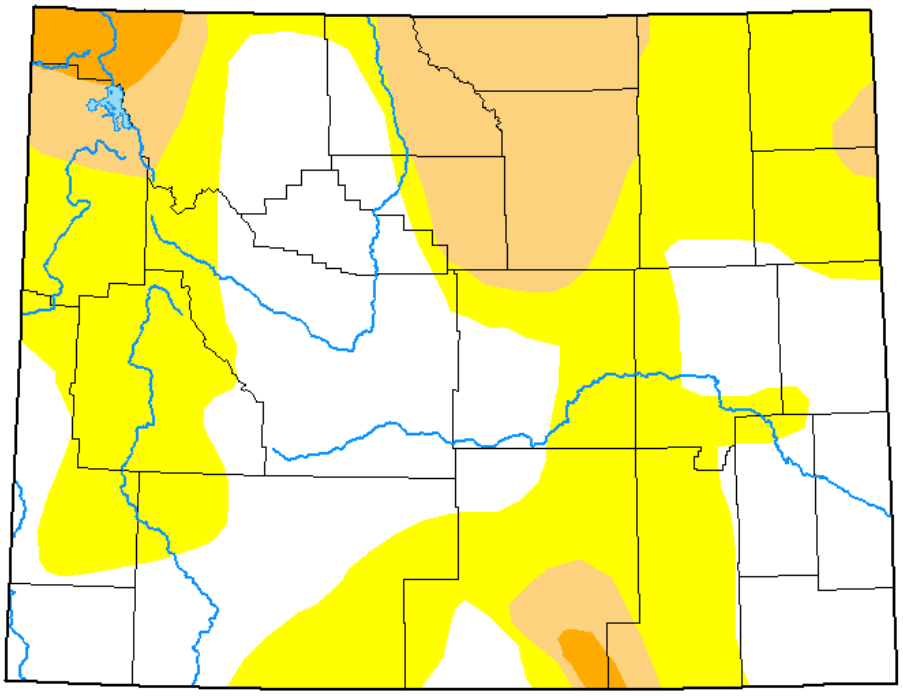
U.S. Drought Monitor

Wyoming

January 30, 2024

(Released Thursday, Feb. 1, 2024)

Valid 7 a.m. EST



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:

Brian Fuchs
National Drought Mitigation 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
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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.

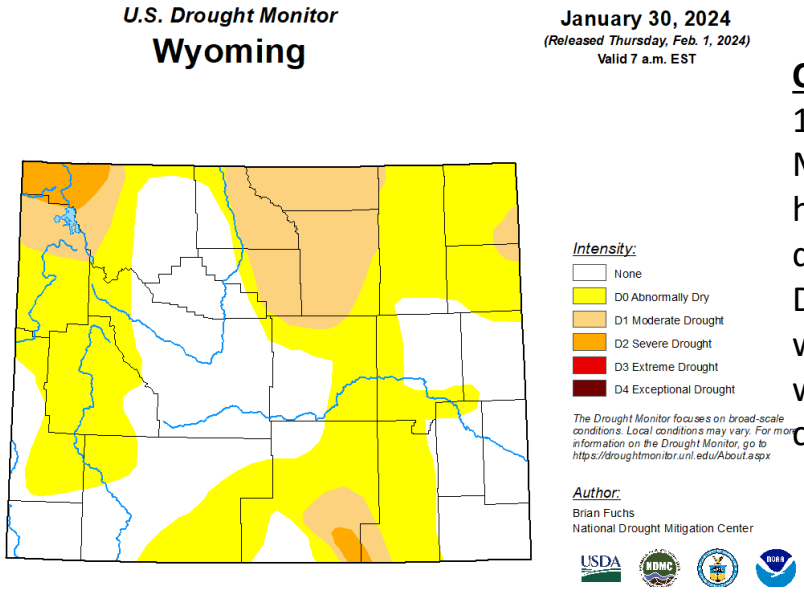
Helpful Hints:

- 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

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.

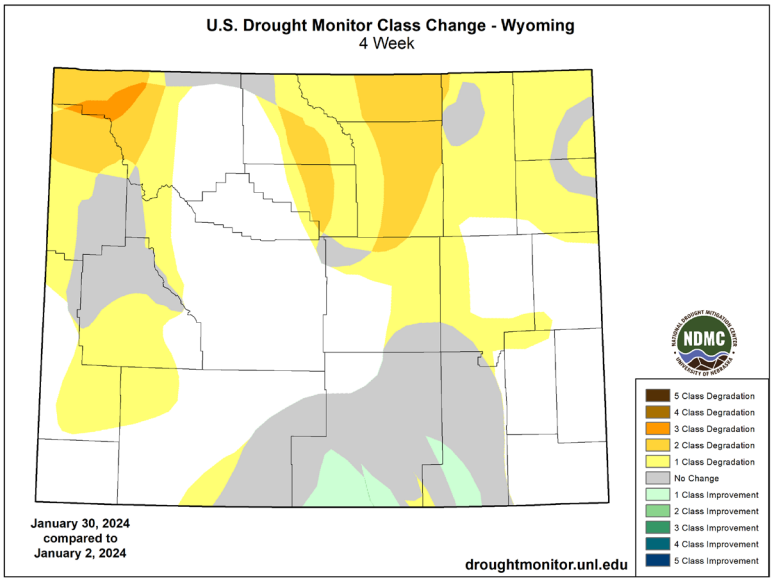


Current Drought Monitor:

100% of Sheridan County is in D1, Moderate Drought. Looking at the history on the next page, this deterioration into Moderate Drought was only official in the last week. Prior to that, Sheridan County was experiencing "Abnormally Dry" conditions or no drought.

Change in Drought Monitor:

Degradation was more drastic in the eastern side of the county. While this side of the county was not experiencing drought conditions per the report one month ago, it has now jumped clear past D0: Abnormally Dry and straight into D1: Moderate Drought. The west side of the county had a more steady decline over the last two months.



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

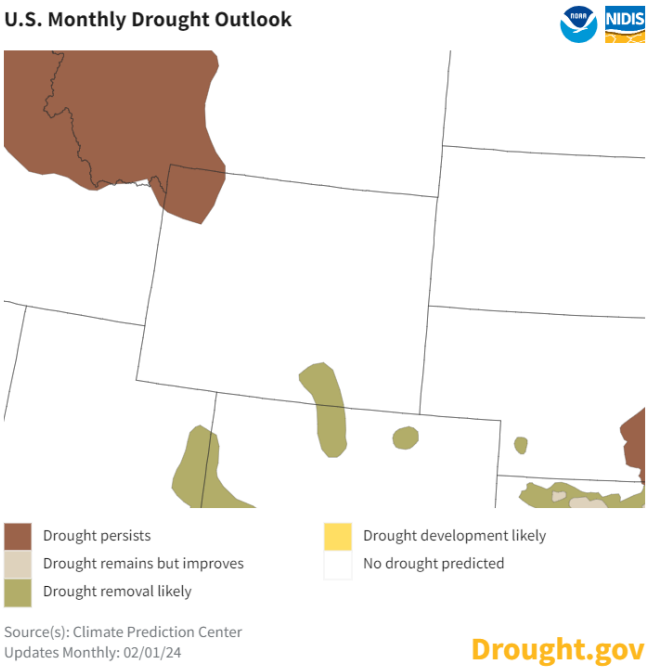
Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2024-01-30	0.00	100.00	100.00	0.00	0.00	0.00	200
Last Week to Current	2024-01-23	0.00	100.00	0.00	0.00	0.00	0.00	100
3 Months Ago to Current	2023-10-31	100.00	0.00	0.00	0.00	0.00	0.00	0
Start of Calendar Year to Current	2023-12-26	90.06	9.94	0.00	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	2023-01-31	92.56	7.44	0.00	0.00	0.00	0.00	7

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 February of 2023, 7.44% of Sheridan County was experiencing abnormally dry conditions (D0). This year is much drier than last year at this same time.

Forecast for Drought Monitor:

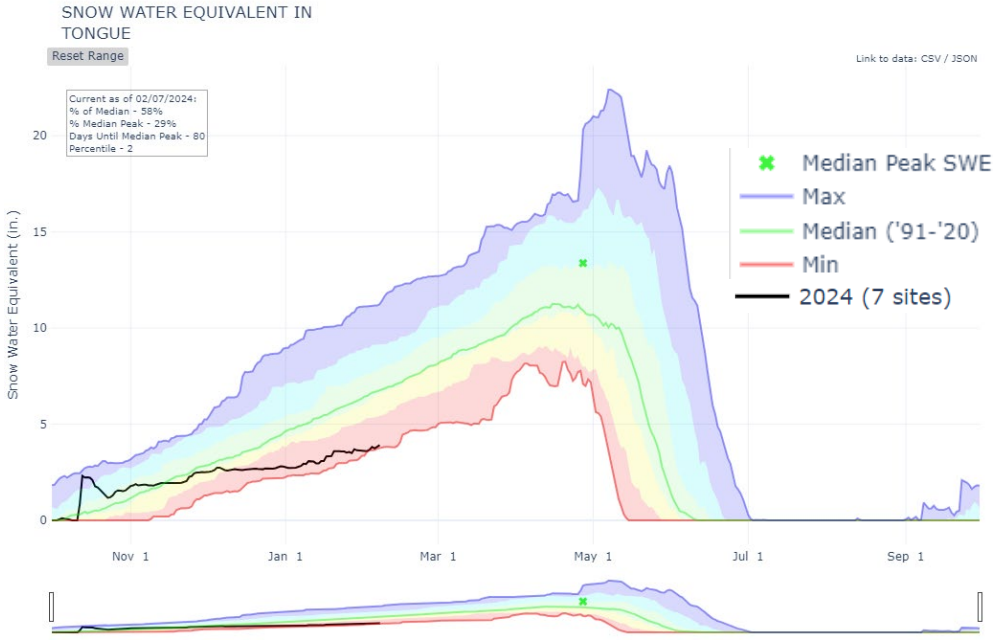
Looking into February, NOAA reports: "In the High Plains region, persistence is forecast across much of the existing drought areas, given unfavorable precipitation forecast for February, coupled with a dry time of year and below normal snowpack across much of the region."[1]

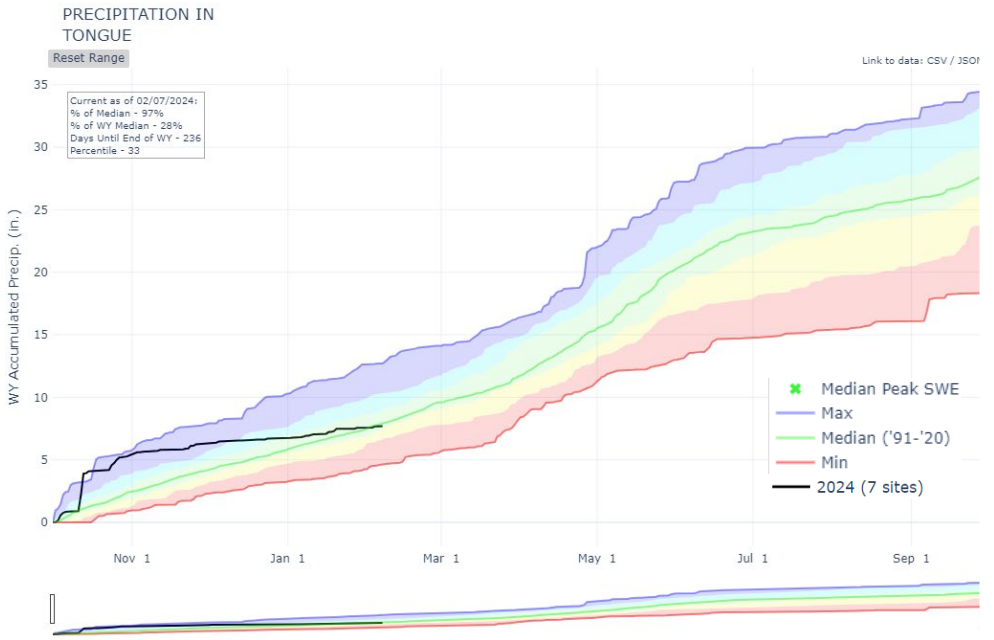


Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
https://www.drought.gov/forecasts
1https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php
https://droughtmonitor.unl.edu/Summary.aspx

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.



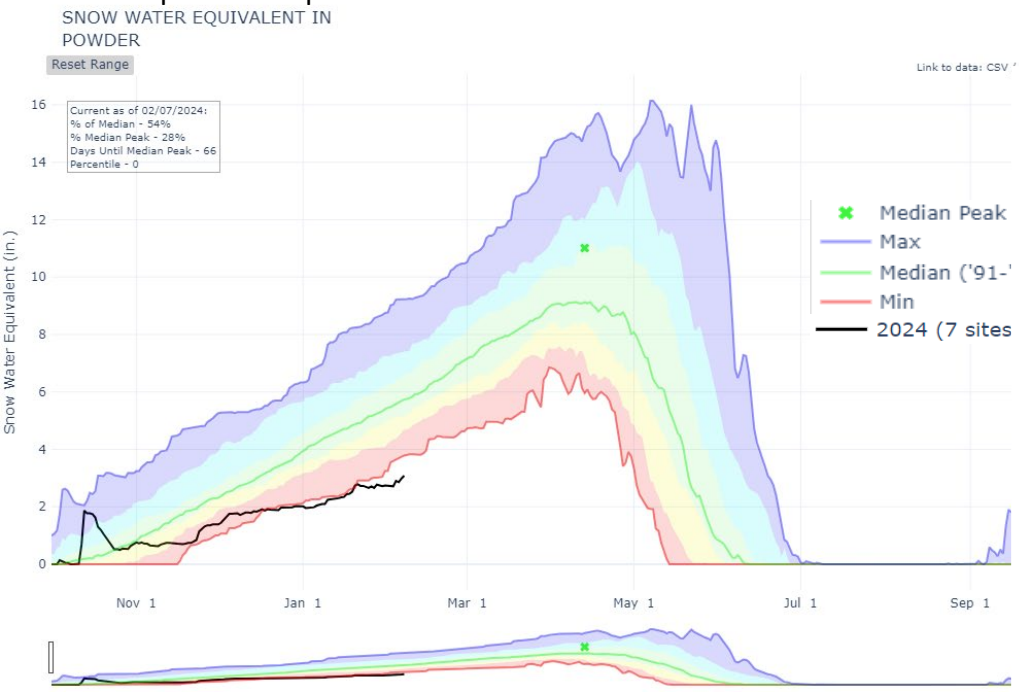


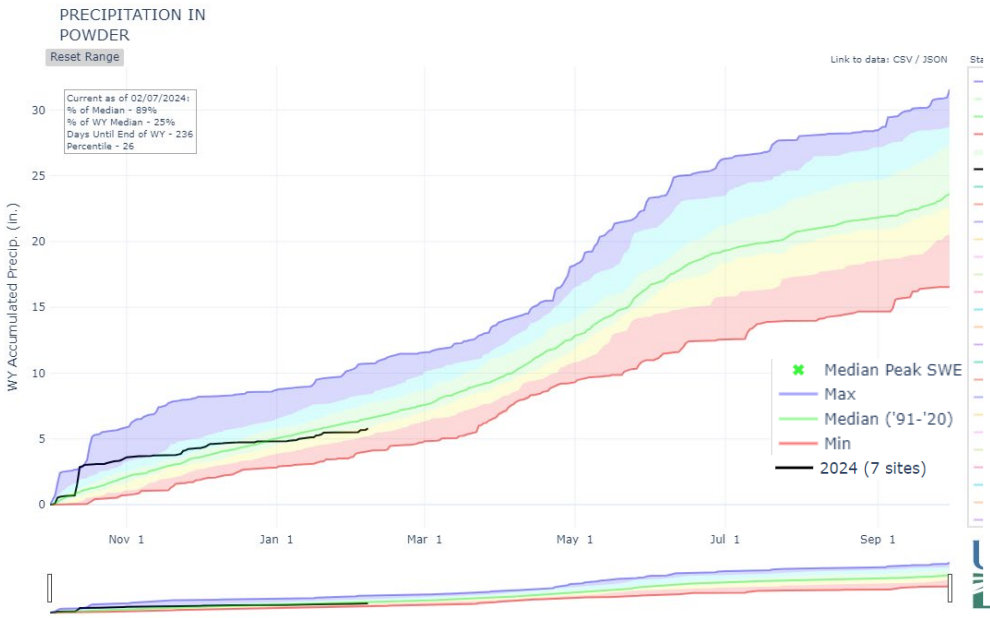
Snow Water Equivalent and Precipitation in Tongue River Watershed: Snow-water equivalent barely rose in January. We are barely hanging onto the bottom of the graph! Meanwhile, precipitation remains near median levels for this time of year.

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.





Precipitation in Powder River Watershed: The dry winter has caused snow water equivalent to fall off the curve in January, representing a new minimum based on the existent data. Precipitation also trends below normal, although closer to what would be expected at 89% of median.

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 inactive storage below the outlet.

Lake DeSmet

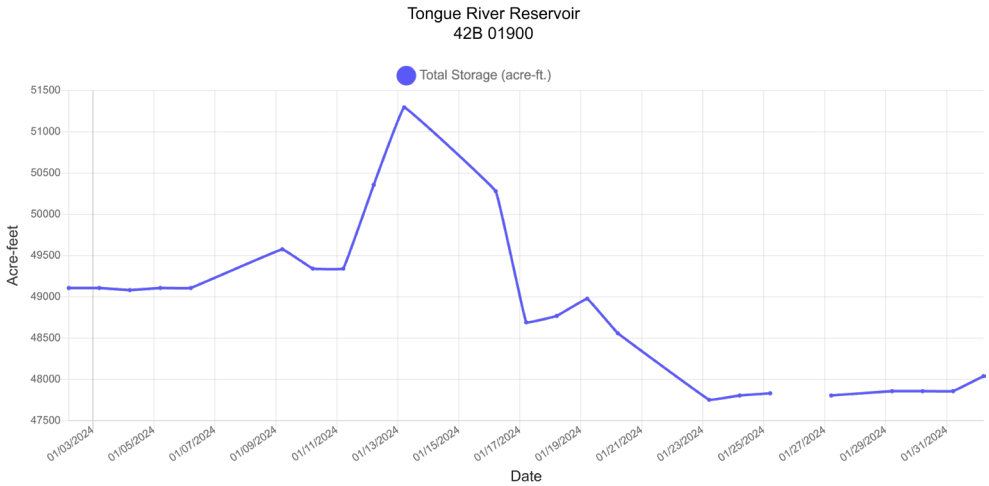
As of February 1, Lake DeSmet has a total of 200,091 acre-feet in storage, nearly the same as in January.

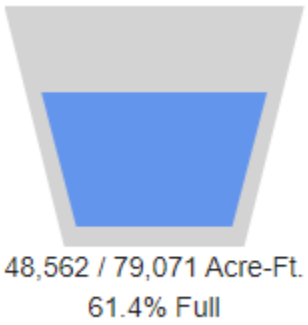
Reservoir	Total Storage (Acre-ft)	Current Storage (Acre-ft)	Percent of Total Capacity (%)
Bighorn	4,624	3,160	68.3
Cross Creek	824	256	31.1
Dome Lake No.1	1,506	1,324	87.9
Kearney Lake	6,324	2,989	47.3
Park	10,362	5,758	55.6
Sawmill	1,275	**	**

**Measurement stations for Sawmill Reservoir are currently offline

Tongue River Reservoir

Water levels at Tongue River Reservoir decreased 2.1% over the last month, from 49,082 acre-feet to 48,040 acre-feet.



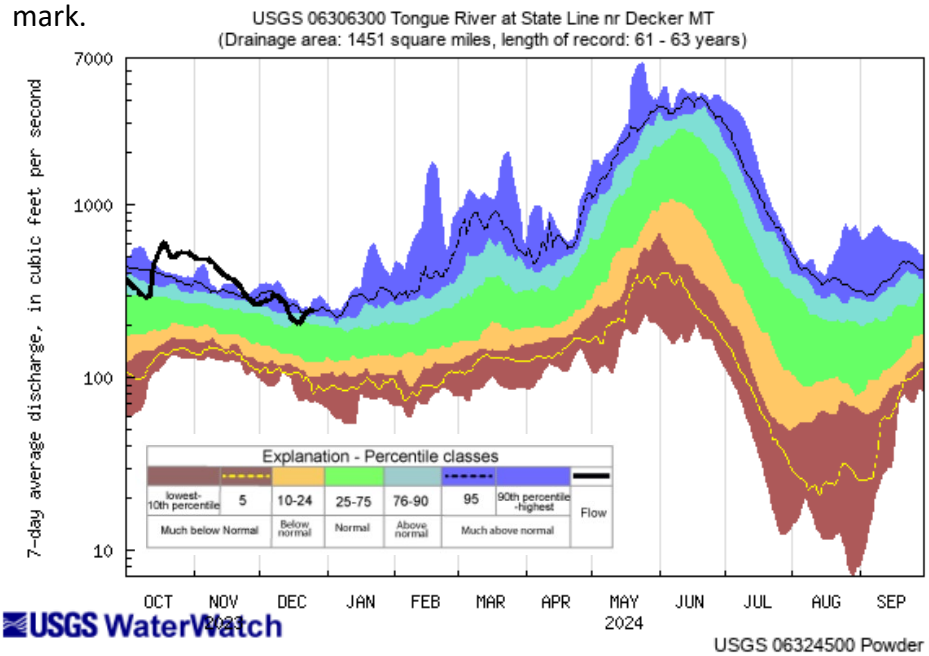


This graph displays the real time data of the Tongue River Reservoir. This data remains provisional until it is officially reviewed due to variables that can affect the gages. Things that can effect that data includes but not limited to algal and aquatic growth, sediment movement, malfunction of recording 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-report/location/3f087fe86bde421f857dfedff4e40e93/1680476400000-1683154740000/

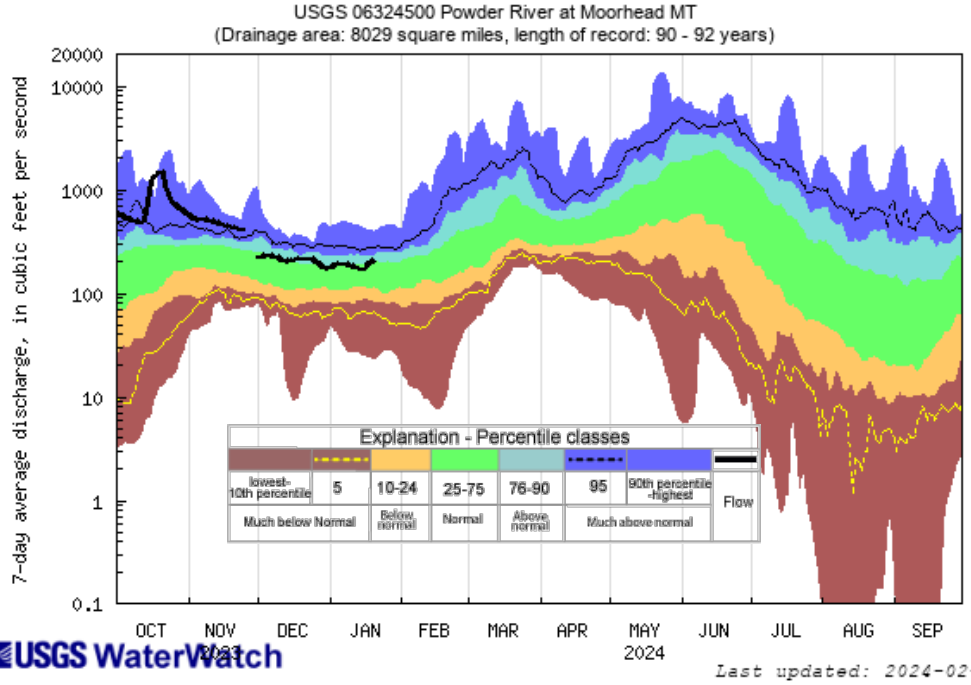
Select Stream Flow Stations

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
Streamflow through mid-December remained higher than normal and ranked in the 90th percentile.

Powder River Border Station Stream Flow:
As of late January, streamflow was within the normal range and near the 75th percentile.



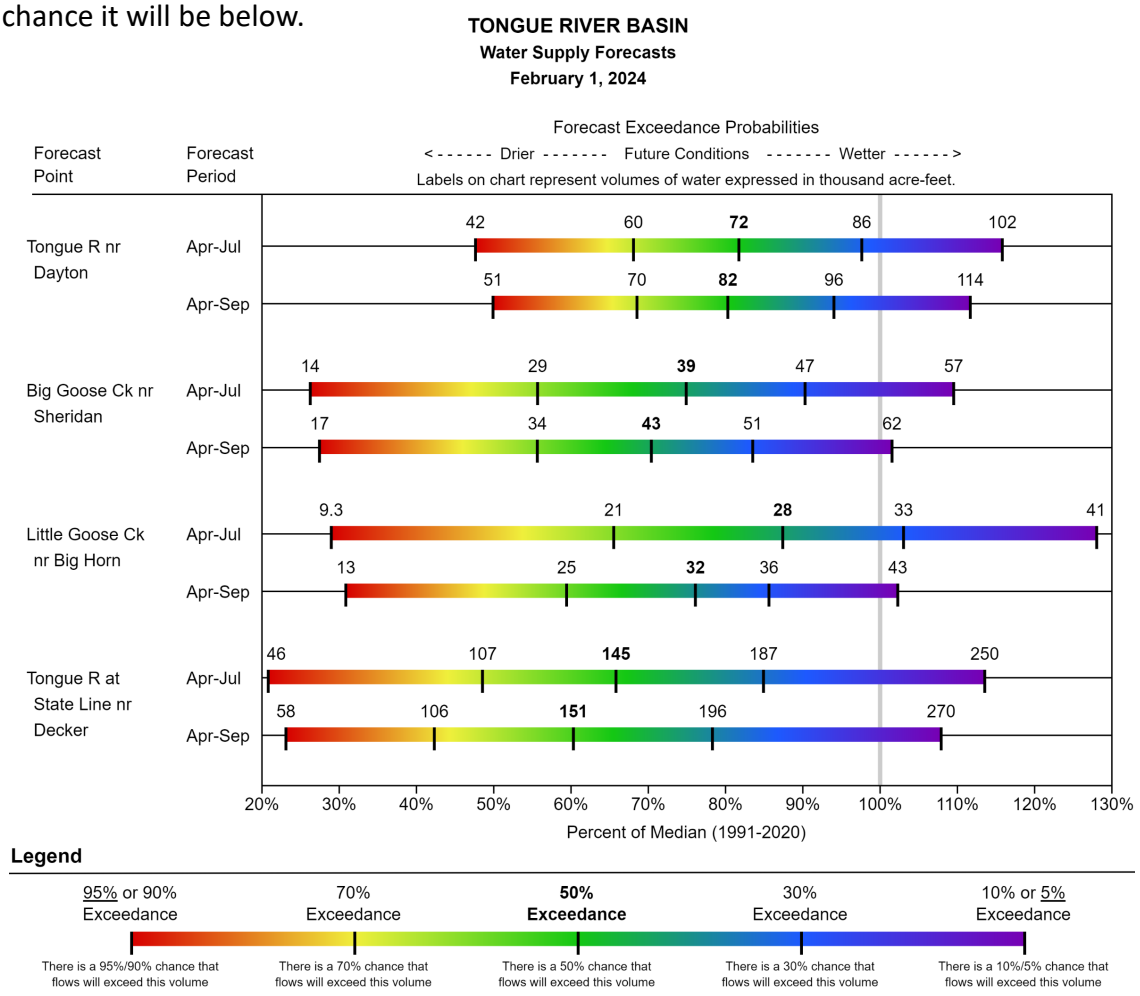
Last updated: 2024-02-07

Sources: https://waterwatch.usgs.gov/index.php?id=mvu1a
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

SCLT

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.

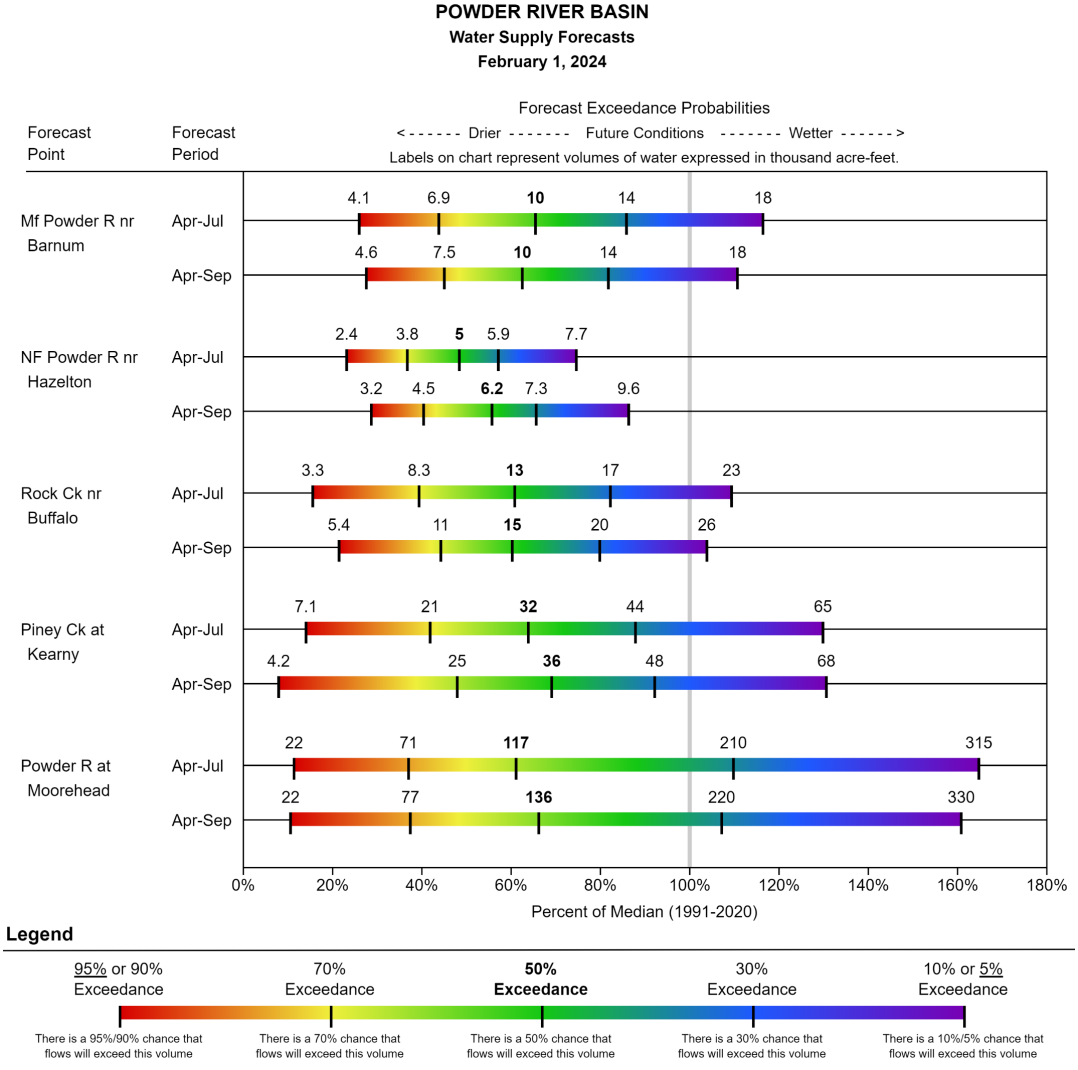


Tongue River Water Supply: This forecast shows drier conditions likely for the Tongue River basin from April to September. For the Little Goose Creek near Big Horn, conditions are expected to be near normal from April to June with a 50% chance that flows will exceed 90% of median. Elsewhere, flows are expected to be lower. This forecast also predicts conditions to be dry for a long season, with flows closer to median from April to July but farther from median looking into September.

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.

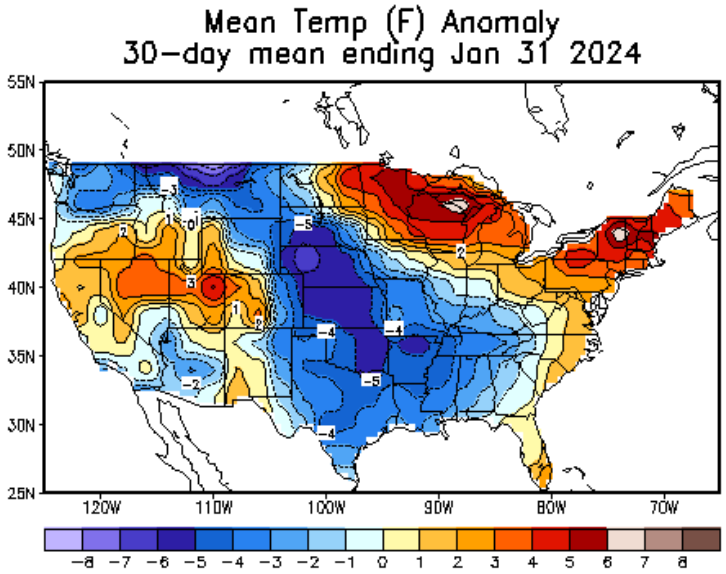


Powder River Water Supply: Conditions are expected to be drier than usual, with many forecast points showing only a 50% chance of flows exceed 60% of median. The forecast for April to July is similar to the long term forecast of April to September.

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

Temperature and Precipitation

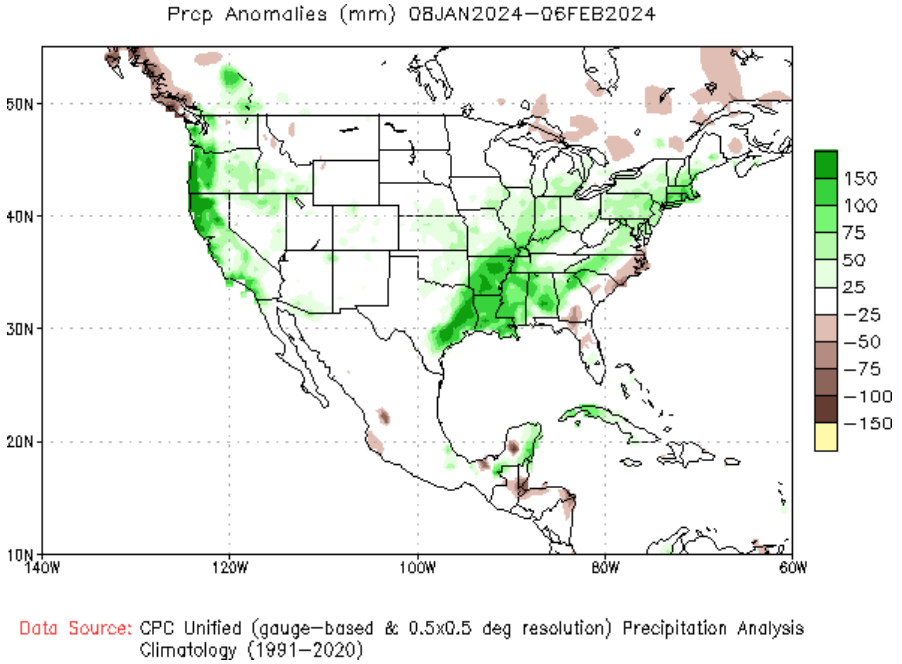
Temperature and precipitation are large drivers of changes in drought conditions. As you might expect, high temperatures and low precipitation can worsen drought conditions while low temperature and high precipitations can improve them.



Temperature Anomaly: January was a month of extremes. The average temperature in January was between 20 and 25 degrees, which is 4 degrees below average for Sheridan County based on previous years. January 2024 had two record-setting hot days (66 degrees on January 28, and 68 degrees on January 30), but it also had two record-setting cold days (-31 on January 13, and -24 on January 14).

Precipitation Anomaly:

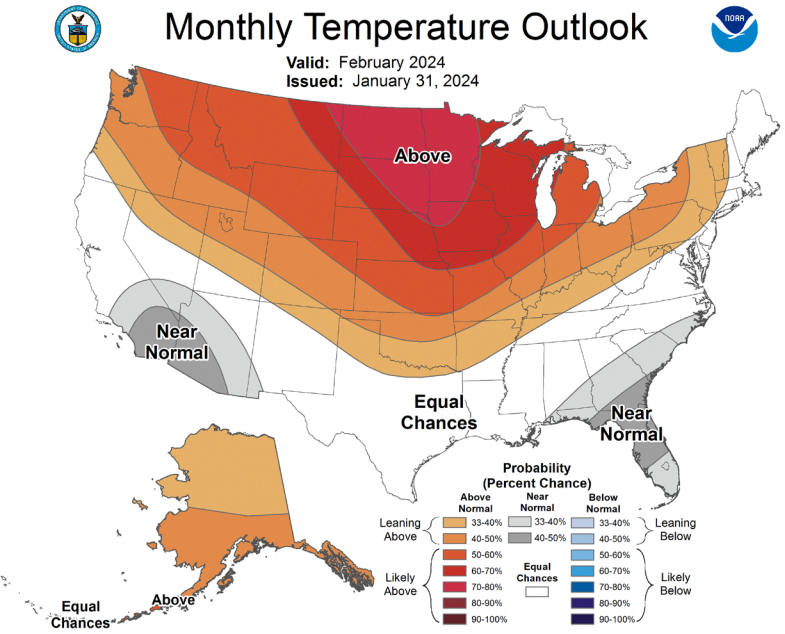
The precipitation anomaly for most of Sheridan County was between 0 and -25 mm.



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

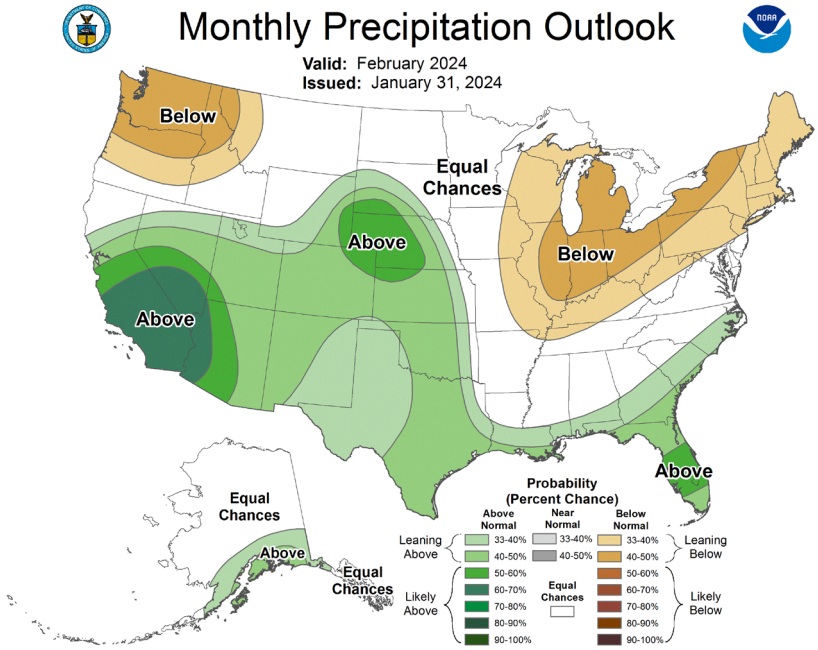
Temperature Forecast and Precipitation Forecast

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.



Temperature: Sheridan County has a 50-60% chance for temperatures being above average in January. Most of the US is expected to be warmer than average in February.

Precipitation: Precipitation is expected to be around average with an equal chance of it being higher or lower. East of Sheridan County has a 33-40% chance of precipitation being above average in February.



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

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://vegdri.unl.edu/Home/VegDRIQuad.aspx?WY,2