Sheridan County Water Supply Report

April- 2024

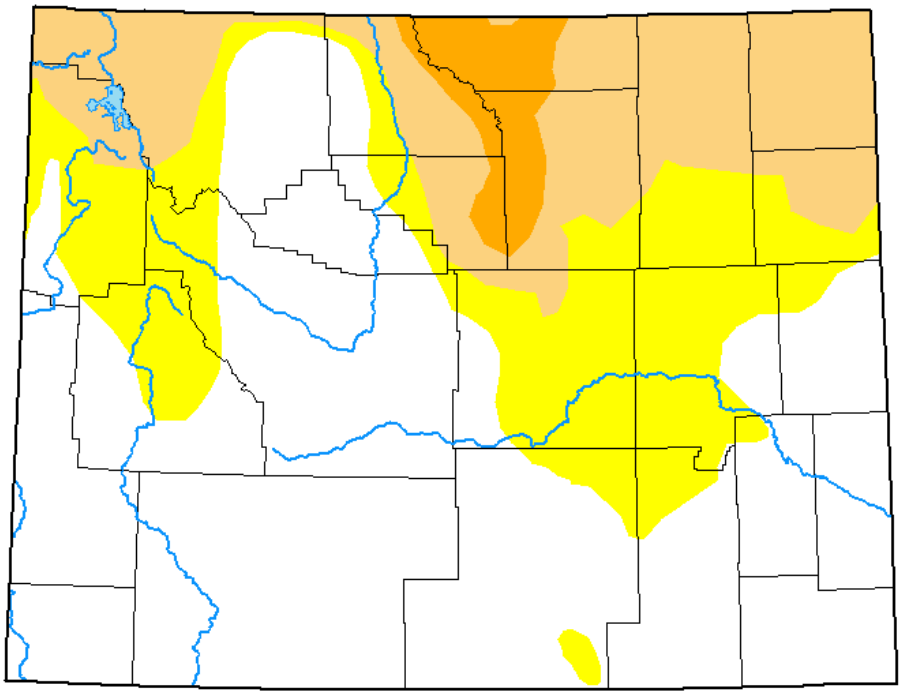
U.S. Drought Monitor

Wyoming

April 9, 2024

(Released Thursday, Apr. 11, 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:

Brad Pugh
CPC/NOAA

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

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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.

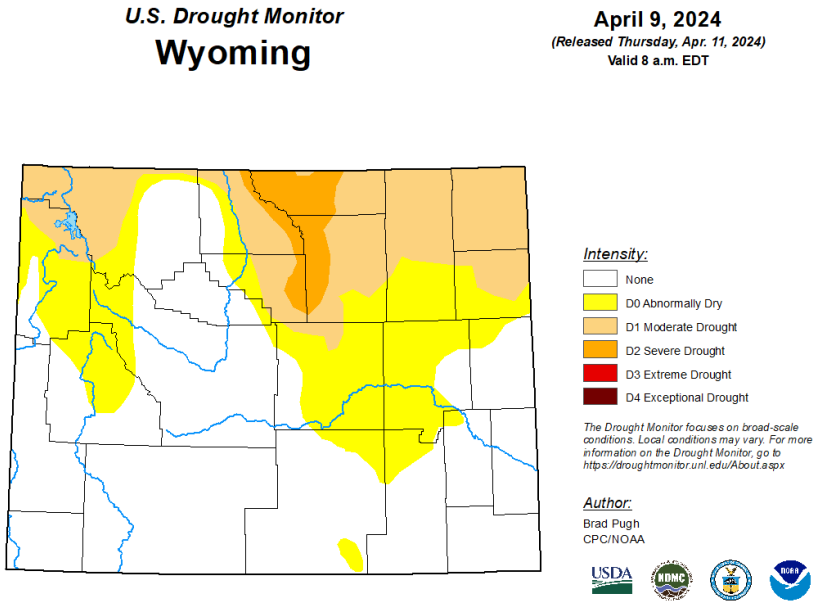
Helpful Hints:

- 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.

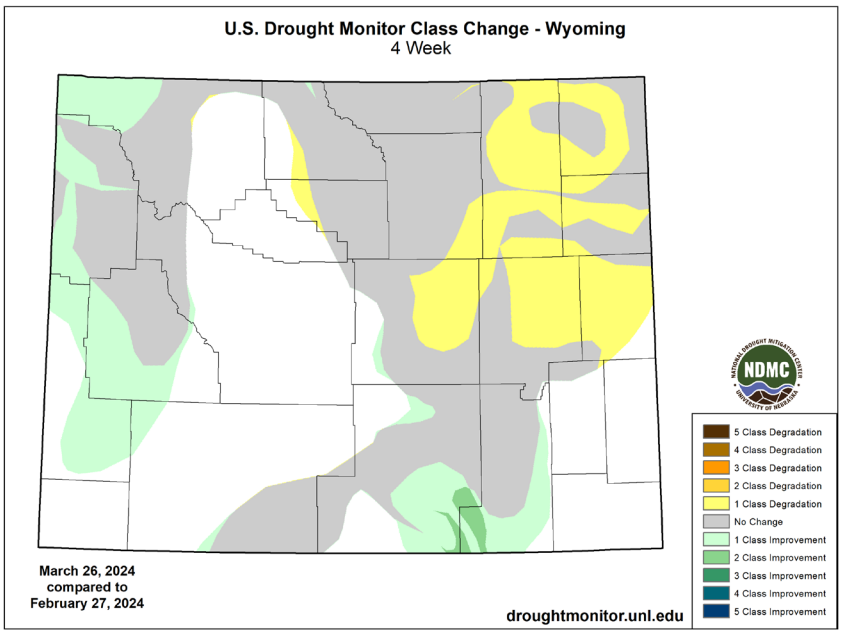


Current Drought Monitor:

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 felt across the county.

Change in Drought Monitor:

While drought conditions did not improve in March, they also did not deteriorate. Overall, there was not a significant change in 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. 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.

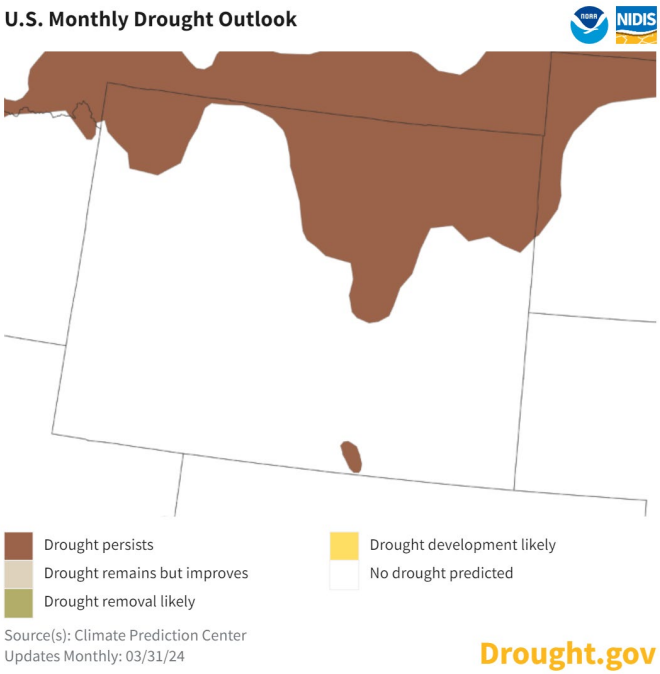
Drought in Sheridan County Over Time: Shown in Percentage Area in Drought

Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2024-03-26	0.00	100.00	100.00	76.29	0.00	0.00	276
Last Week to Current	2024-03-19	0.00	100.00	100.00	75.90	0.00	0.00	276
3 Months Ago to Current	2023-12-26	90.06	9.94	0.00	0.00	0.00	0.00	10
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	2023-03-28	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: Last year, at the end of March 2023, 0% of Sheridan County was experiencing abnormally dry conditions (D0). This year is much drier than last year at this same time.

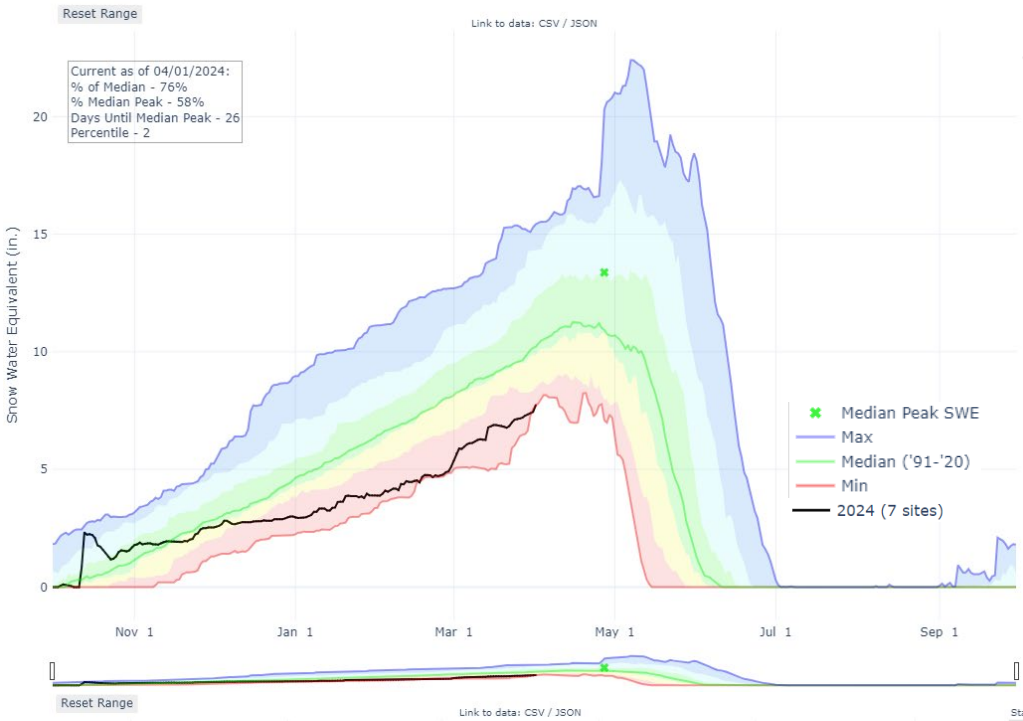
Forecast for Drought Monitor:
Looking into March, NOAA reports: "Below normal seasonal snowpack is prominent across the Northern Plains in the High Plains Region. Although there was some beneficial precipitation over the past couple of weeks that resulted in some modest improvements across the Dakotas and above normal precipitation is also favored through early April, drought is favored to persist through the end of April, as warmer and drier conditions are forecast during the latter half of the month. ."[1]

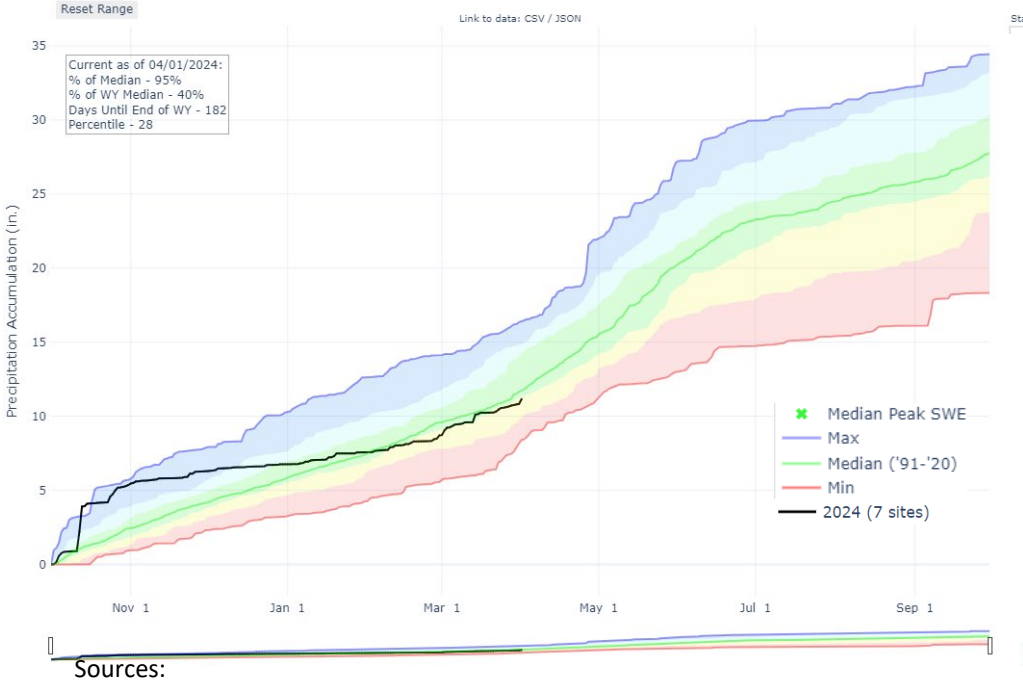


Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
https://www.drought.gov/forecasts
1https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php
https://droughtmonitor.unl.edu/Summary.aspx

Precipitation - Tongue River

These graphs represent precipitation 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:

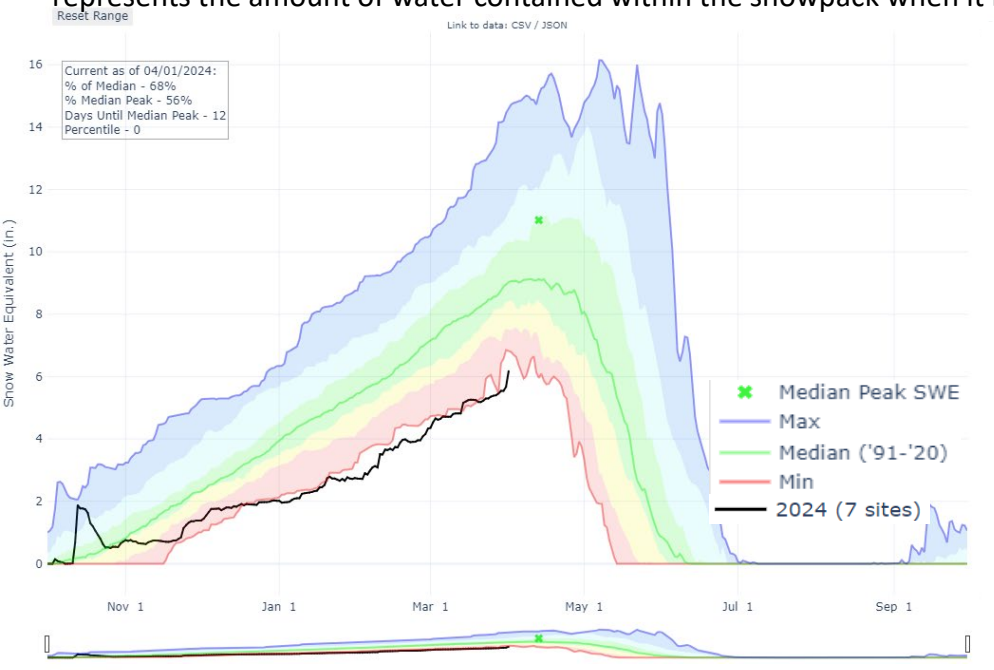
Snow-water equivalent is at 76% of median. This puts it in the 2nd percentile for the time of year. Snow conditions for this year looked very similar to the year 2001. Looking at just the last 20 years, this was the second worst winter on record with only 2016 showing lower snowpack.

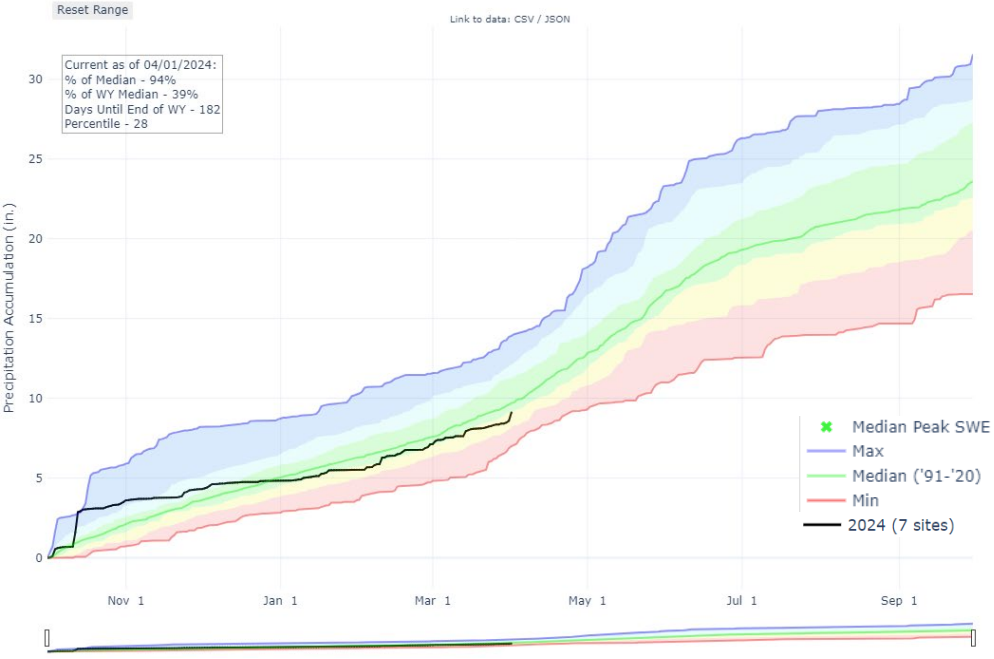
In terms of precipitation, the Tongue River watershed is at 95% of median. In this respect, the 2024 water year is doing better than the conditions in 2016or 2001 where both SWE and precipitation were abnormally low. High temperatures this winter may have caused more rain events although less snow accumulation.

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 68% of median, which is below the 0th percentile. This winter produced abnormally low snowpack. Current conditions are lower than they were at this time in 2001 or 2016; which were the last comparable low snow years.

Precipitation is at 94% of median, in the 28th percentile. Like conditions in the Tongue River watershed, this is markedly high precipitation than were experienced in 2001 or 2016. Although drier overall, the warmer winter may have resulted in a shift from snow accumulation to more precipitation events.

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.

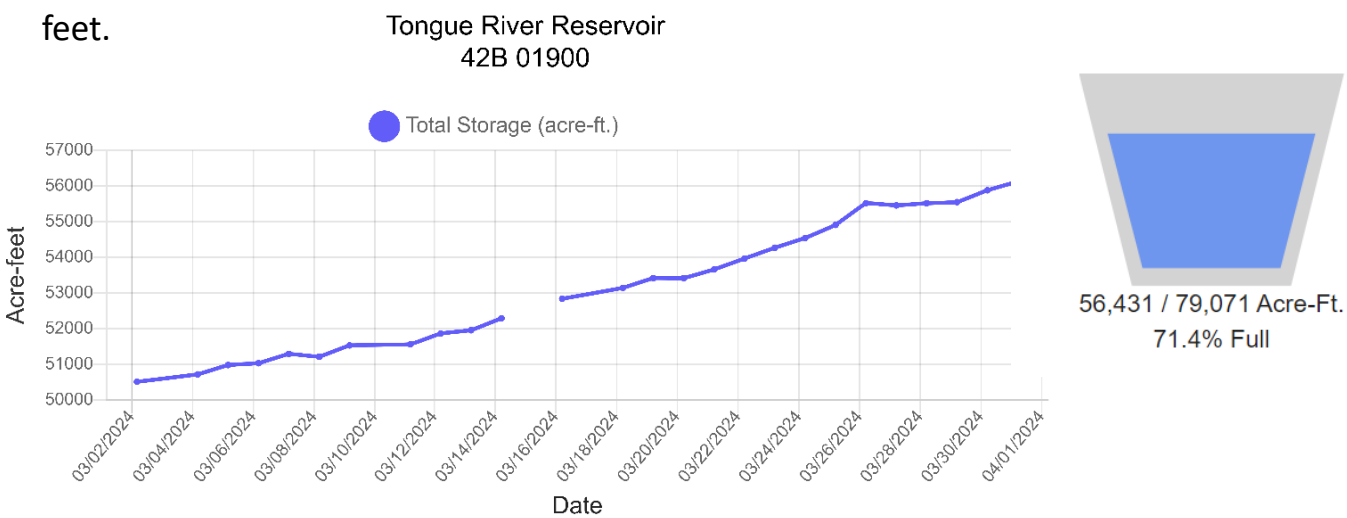
Lake DeSmet

As of April 1, Lake DeSmet has a total of 200,384 acre-feet in storage, a slight increase since March.

Reservoir	Total Storage (Acre-ft)	Current Storage (Acre-ft)	Percent of Total Capacity (%)
Bighorn	4,624	3,478	75.2
Cross Creek	824	203	24.6
Dome Lake No.1	1,506	1,333	88.5
Kearney Lake	6,324	2,932	46.4
Park	10,362	5,288	51.0
Sawmill	1,275	942	73.9

Tongue River Reservoir

Water levels at Tongue River Reservoir increased 14.9% over the last month, from 49,082 acre-feet to 56,431 acre-feet.

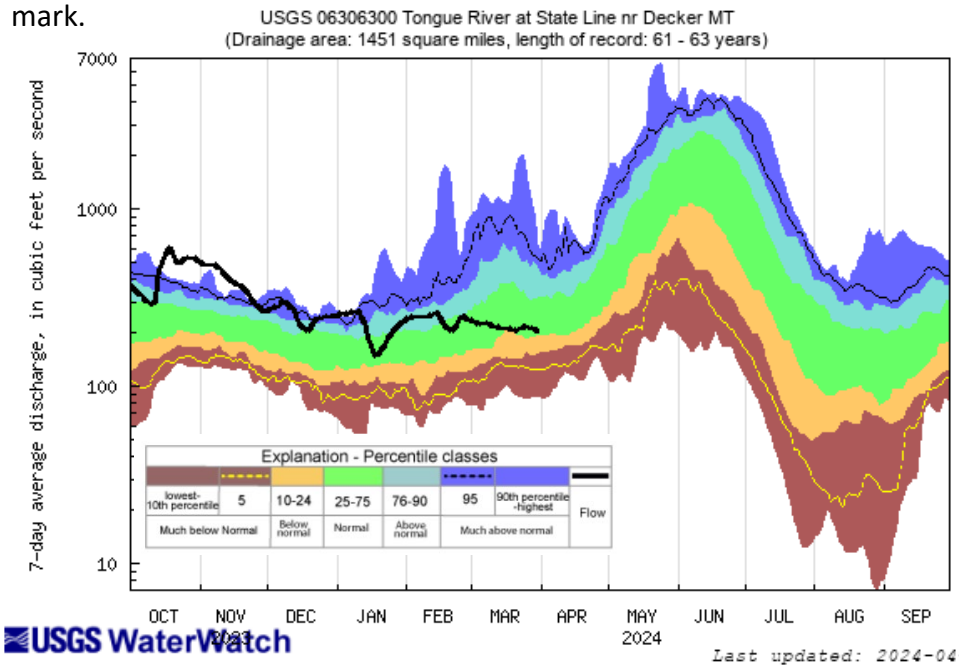


This graph displays the real time data of the Tongue River Reservoir. This data remains provisional until it is officially reviewed due to variables that can affect the gages. These include but are not limited to algal and aquatic growth, sediment movement, malfunction of recording equipment, and back 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/

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.

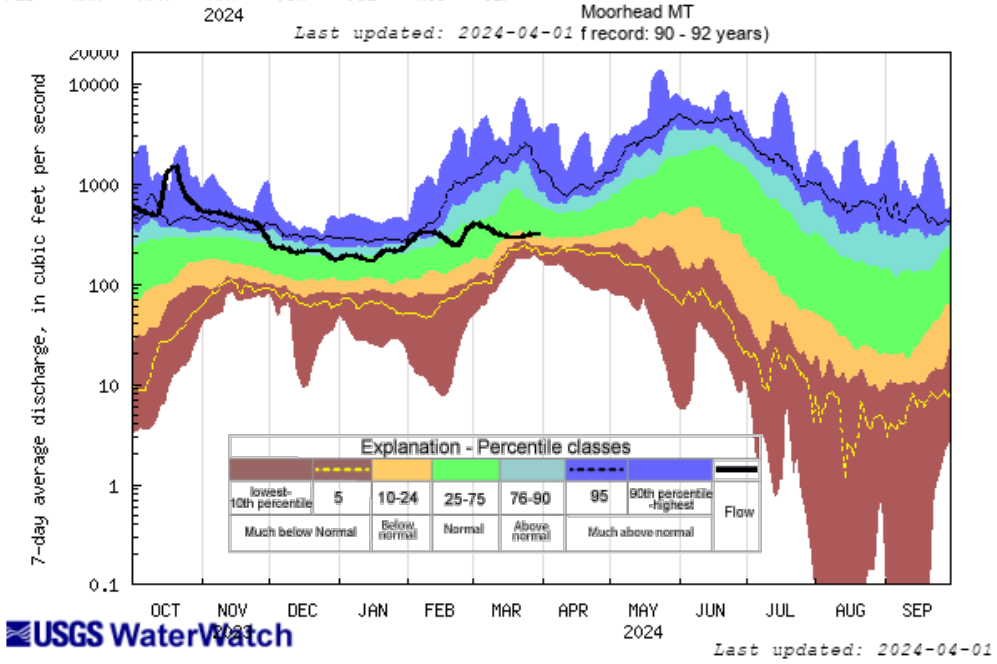


Tongue River Border Station Stream Flow

Streamflow has generally remained in the "Normal" range, or 25-75th percentile, as we move into 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:

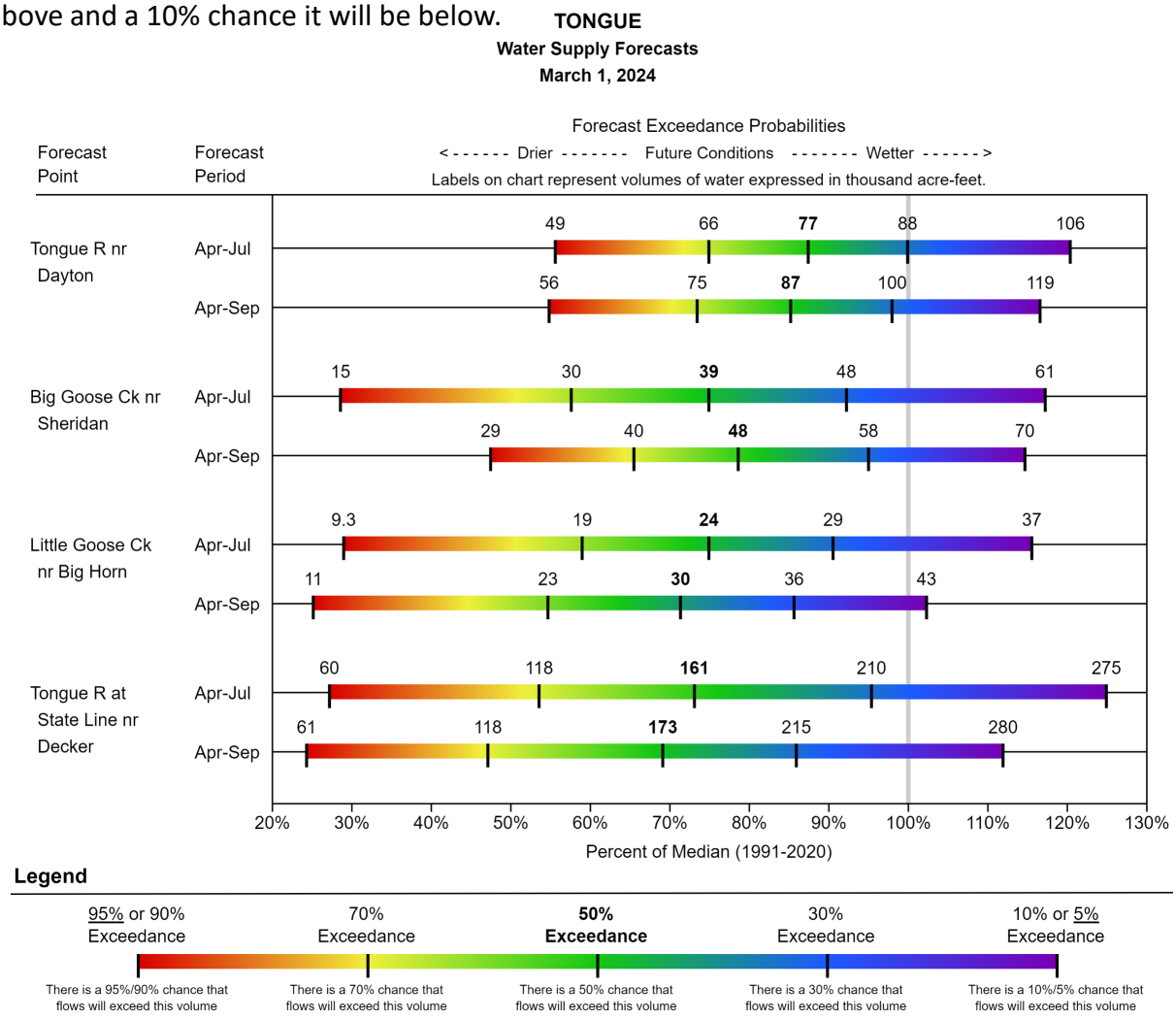
After high stream levels in the beginning of the water year, streamflow has decreased into the "Normal" range or 25-75th percentile. In March, streamflow decreased to "below normal" but has since returned.



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.

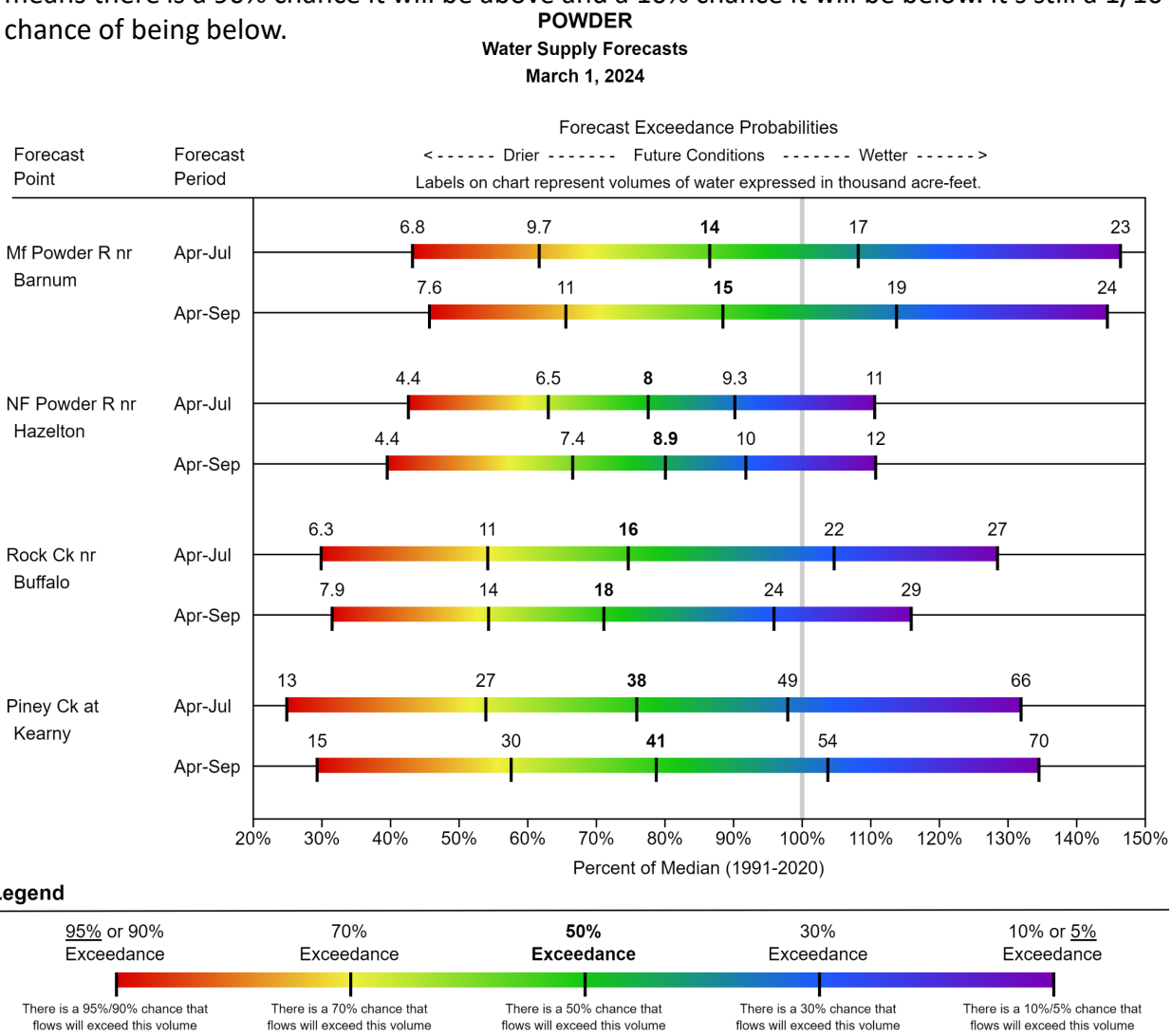


Tongue River Water Supply: This forecast shows drier conditions likely for the Tongue River basin from April to September. For the Little Goose Creek near Big Horn, conditions are expected to be near normal from April to June with a 50% chance that flows will exceed 90% of median. Elsewhere, flows are 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 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.



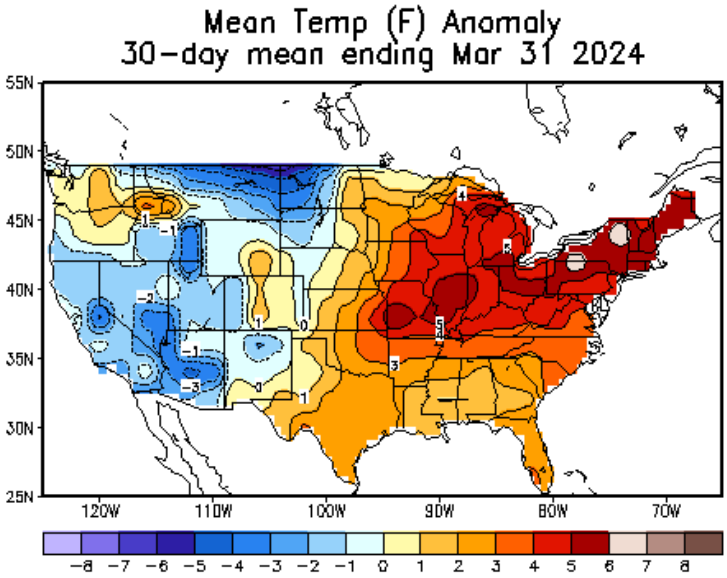
Legend

Powder River Water Supply: Conditions are expected to be drier than usual, with many forecast points showing only a 50% chance of flows exceed 80% of median. The forecast for April to July is similar to the long term forecast of April to September. This forecast was last updated in March, but is better than the forecast in February.

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

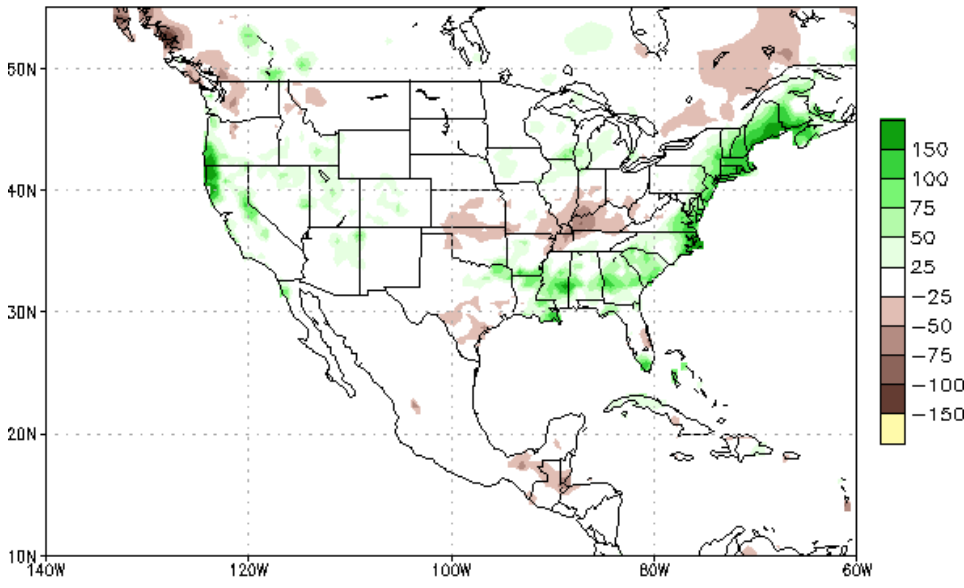
Temperature and Precipitation

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: March was near normal, with a temperature anomaly 1 to 2 degrees below average. The average temperature in March was between 30 and 35 degrees in most of Sheridan County.

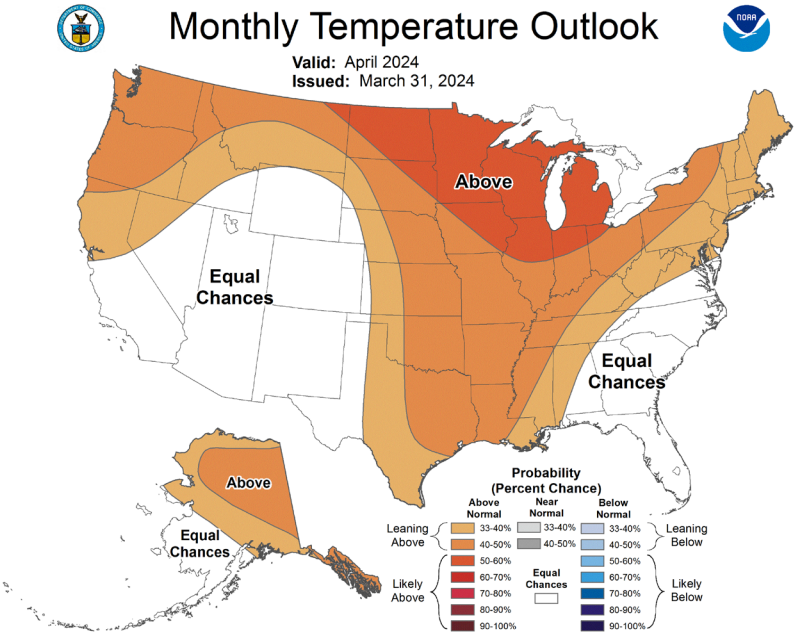
Precipitation Anomaly: The precipitation anomaly for most of Sheridan County was 0 mm, indicating normal or near normal precipitation for March compared to other years.



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

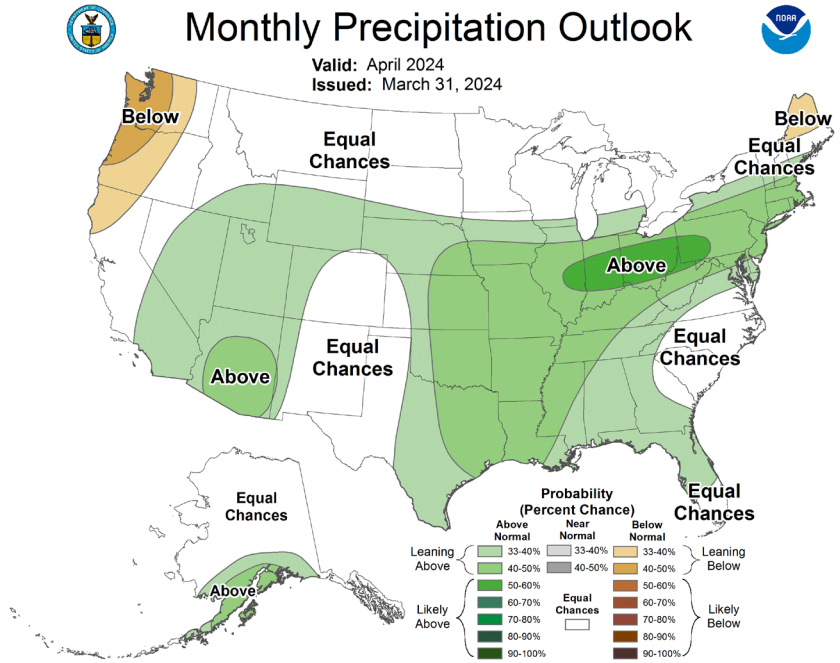
Temperature Forecast and Precipitation Forecast

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

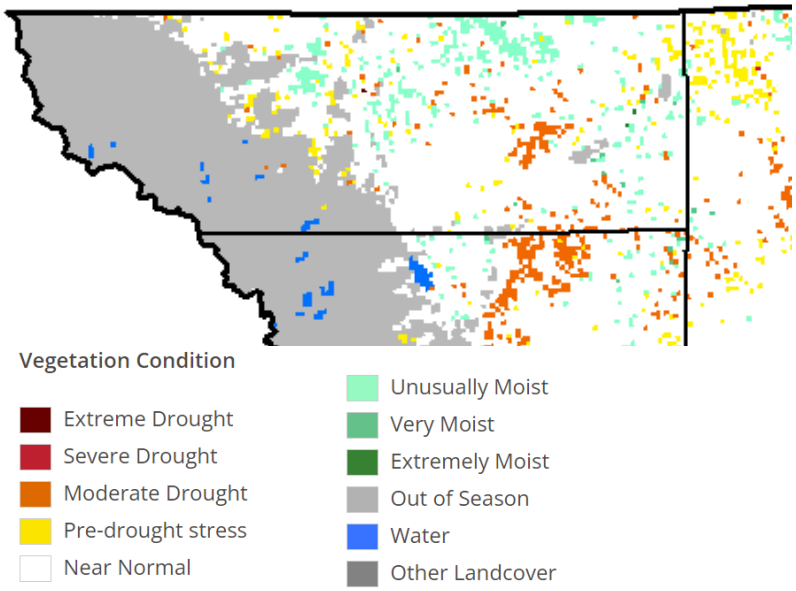
Precipitation: There are equal chances forecasted of precipitation being higher or lower than normal for most of Sheridan County in April, although most of Wyoming has a 33-40% probability of above normal precipitation.



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

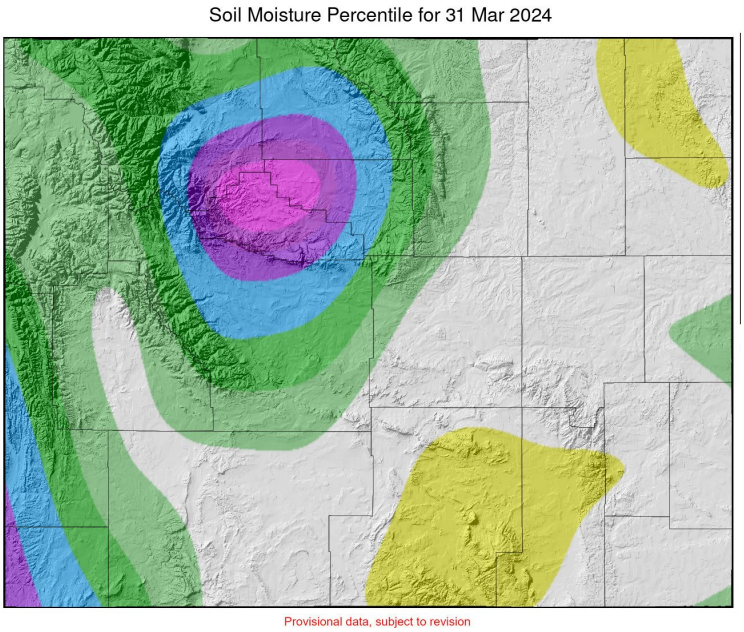
Vegetation Drought Response and Soil Moisture

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
o them so is linked to vegetative stress.



Vegetation Drought Response:
Despite drought conditions, vegetation response in most of Sheridan County is near-normal, with some areas even showing 'unusually moist' vegetative status. Moderate drought pre-drought stress is seen in other areas of the county.

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.



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

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